New Orleans Medical
and
Surgical Journal

Vol. 95 DECEMBER, 1942 No. 6

CLINICAL APPLICATIONS OF RECENT KNOWLEDGE CONCERNING BLOOD SUBSTITUTES*

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It scarcely seems necessary to emphasize the present need for an adequate substitute for blood. This need has long been felt but it has taken the pressure of two world wars to accelerate research for such a substitute. What then constitutes the ideal blood substitute? This has been defined by Maes and Davis[1] as a fluid which possesses the following properties: (1) availability; (2) effectiveness; (3) freedom from toxicity even when administered in large quantities; (4) lack of deterioration with prolonged storage; (5) content of one or more of the elements of blood; (6) possession of one or more of the biologic properties of blood; for example, ability to transport oxygen or ability to maintain the osmotic pressure of the blood. To these six attributes must be added a seventh; namely, freedom from antigenicity. It will be our purpose here to review the facts which have emerged from the clinic and from the laboratory concerning substitutes for fresh human blood.

CONSERVED BLOOD

Blood for conservation may be obtained from human donors, from human placentas, and from human cadavers. Conserved blood undergoes cellular and chemical changes which diminish its effectiveness as a fresh blood substitute. Thus, it has been found that even under optimal conditions certain changes occur: (1) Diminution in the number and phagocytic activity of the leukocytes; (2) disintegration of the blood platelets; (3) hemolysis; (4) increase in lactic acid and carbon dioxide and a diminution in oxygen; (5) reduction in the prothrombin content; (6) increase in the free potassium, which varies directly with the degree of hemolysis. The incidence of post-transfusion reactions, as might be expected, is greater with conserved blood than it is with fresh blood. Thus, in 2,373 transfusions of conserved blood from human donors, the incidence of reactions was 13.8 per cent. Of 214 transfusions with conserved placental blood, reactions occurred in 14.6 per cent. In 1,639 transfusions with conserved cadaveric blood the incidence of reactions was 19.6 per cent. In the majority of instances the reactions were due to contamination of the blood or to hemolysis of the transfused red blood cells. Another cause of transfusion reactions is incompatibility of the blood of the donor with that of the recipient. It is not our purpose here to review the theory of blood groups. However, certain advances have been made and several new blood groups have come to be recognized. In addition to the four blood groups, O, A, B, and AB, there are now recognized subgroups A_1, A_2, A_1B, and A_2B, which depend upon qualitative differences in the A agglutinogen and which can be detected by human isoagglutinins. Other agglutinogens, M, N, P, and Rh, have been recognized by

*Read before the sixty-third annual meeting of the Louisiana State Medical Society, New Orleans, April 29, 1942.

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means of heterologous isoagglutinins and are apparently of significance in the etiology of a certain number of post-transfusion reactions. The use of universal donor blood (group 0) has been followed by severe and even fatal hemolytic reactions. This is due to the fact that the serum of group 0 blood contains a and b isoagglutinins which are usually of low concentration. However, the blood of 3 per cent of group 0 donors contains a high concentration of these isoagglutinins and it is such blood which is liable to produce hemolytic reactions. By serial dilutions of the serum, the concentration of isoagglutinins may be determined before transfusion in order to avoid the use of a blood containing large amounts of a and b isoagglutinins. A more serious problem is presented by the occurrence of homologous group incompatibility. Not infrequently severe hemolytic reactions may follow the use of blood of the same group as that of the recipient. An explanation of this paradoxical phenomenon has been furnished by Landsteiner and Wiener[2] who have described an Rh agglutinogen and isoagglutinin in human blood. The presence of the Rh agglutinogen in human red blood cells can be determined by means of immune serum obtained from rabbits which have been given injections of blood from rhesus monkeys. In this way it has been found that 85 per cent of human beings are Rh-positive, that is, the Rh agglutinogen is present in the erythrocytes, and 15 per cent are Rh-negative, that is, the Rh agglutinogen is absent from the erythrocytes. The transfusion of Rh-positive blood into Rh-negative recipients is not followed usually by any reaction. In a small group of Rh-negative individuals, the Rh-positive blood acts as an antigen so that subsequent injections of Rh-positive blood result in a violent hemolytic reaction. The presence of isoimmunization to Rh-positive blood is not readily detected, since the reaction *in vitro* between Rh agglutinogen and isoagglutinin is weak. Special methods of detection must be used. The Rh hemolytic reaction occurs in two types of patients: (1) Rh-negative individuals who have received previous injections of Rh-positive blood; (2) women who are pregnant or have been pregnant recently and have not previously received a blood transfusion. In the latter group it has been found that Rh-positive substances are released from the fetus and produce isoimmunization in an Rh-negative mother.

A less frequent form of isoimmunization has been described by Wiener[3] in which a patient of sub-group A_2 was rendered immune to A_1 agglutinogen following the transfusion of sub-group A_1 blood. The presence of types M, N, and P does not appear to be significant in relation to transfusion reactions although rare instances have been recorded in which anti-M antibodies have been detected in human beings. This newer knowledge of blood groups and types must be considered in relation to the transfusion not only of fresh human blood but also of conserved human blood, whatever its source may be.

The dangers arising from the transfusion of so-called universal donor blood (group 0) have been referred to. The recent work of Witebsky and his co-workers[4] is of interest in this connection. These investigators have shown that it is possible to inactivate the a and b isoagglutinins which are present in group 0 blood plasma. By adding to 500 c. c. of blood 25 mg. of A specific substance, which is obtained from commercial pepsin, mucin and peptone, the a isoagglutinin is inactivated. The b isoagglutinins are inactivated by adding B specific substance which is obtained from the gastric juice of human beings who belong to group B. The exact procedure as outlined by Witebsky and his co-workers[4] is as follows: 25 c. c. of A substance (1:1,000 dilution) and 10 c. c. of B substance (1:1,000 dilution) are added to 500 c. c. of citrated blood at least five minutes before transfusion. These workers have given 40 transfusions of group 0 blood, which has been treated in this manner, without reactions. This procedure is definitely promising, inasmuch as it may eliminate reactions due to high titers of a and b isoagglutinins in group 0 blood.

HEMOGLOBIN—RINGER'S SOLUTION

Extracellular hemoglobin takes up oxygen more rapidly than does intracellular hemoglobin (Hartridge and Roughton[5]). Moreover, solutions of hemoglobin can exert a collodial osmotic pressure which is greater than that of the plasma proteins (Adair[6]). With these facts in mind, Amberson and his co-workers[7] used 12 to 14 per cent hemoglobin in Ringer's solution as a substitute for blood. They found that this solution could carry oxygen and maintain the colloidal osmotic pressure of the blood for short periods of time in animals which had been exsanguinated. However, the hemoglobin was soon converted to methemoglobin and rapidly excreted through the kidneys.

More recently Buttle and his co-workers[8] used a hemoglobin solution (3.7 grams of ox hemoglobin per 100 c. c. of Ringer's solution) in cats subjected to hemorrhage. These investigators found an immediate rise in blood pressure, which, however, showed a tendency to fall later. They concluded that hemoglobin-Ringer's solution was inferior to whole blood but superior to gum-saline solution. Aubertin and his co-workers[9] injected hemoglobin solution by vein into dogs and obtained a high death rate, many of their animals revealing pulmonary and renal lesions. Fairley[10] studied the fate of extracorpuscular circulating hemoglobin in man. He injected isotonic solutions of human hemoglobin in sodium chloride solution. He found that such hemoglobin is treated as a foreign substance by the body and is removed by excretion through the kidneys, by absorption by the reticulo-endothelial cells, and by catabolism in the circulation with the production of methemalbumin. Despite these facts, O'Shaughnessy and his co-workers[11] transfused 5 per cent hemoglobin in Ringer's solution into human beings but obtained severe reactions. It is evident that hemoglobin in solution is not yet ready to be used clinically as a blood substitute. The substitutes for fresh human blood which have been discussed thus far all possess the ability to carry oxygen. In chronic and hemolytic anemia this property is an advantage. In most surgical conditions which require fluid replacement, for example, burns, traumatic shock, and hemorrhage, sufficient hemoglobin remains in circulation to provide the tissues with oxygen. This constitutes the basis for the use of blood substitutes which are devoid of the ability to carry oxygen.

HOMOLOGOUS PLASMA AND SERUM

The experimental basis for the use of homologous plasma and serum in clinical practice was established by the work of Guthrie and Pike.[12] These investigators found that plasma and serum could effectively replace whole blood in experimental hemorrhage. Their work was applied to human beings by Payne and Steen,[13] by Mairano and Teneff,[14] by Kunz[15] and by many others. It is not our purpose here to go into details regarding the use of plasma and serum. The efficacy both of plasma and of serum has been well established in conditions associated with a reduction of the volume of whole blood, of plasma, and of plasma protein. Numerous reports which have appeared since the onset of World War II confirm this statement. Much discussion has arisen as to the relative value of plasma and serum. There does not appear to be any clear-cut evidence that one is more efficacious than the other. Serum possesses the advantage of not forming fibrin clots when it is refrigerated. Plasma does form such clots but this may be prevented by diluting the plasma with an equal volume of normal saline solution. On the other hand, a greater yield can be obtained of plasma than of serum per unit quantity of whole blood.

DRIED SERUM AND PLASMA

The necessity for, and expense of, temperature control in storing liquid serum and plasma has led to the introduction of dried serum and plasma. This is usually carried out by freezing the serum and plasma, followed by extraction of water from the frozen product *in vacuo*. The dry serum or plasma appears as a yellowish-brown powder which is very soluble in water. The

plasma or serum can be reconstituted by the addition of sterile distilled water to the powder. The concentration can be varied from normal to several times normal by altering the amount of water. The dried serum or plasma does not require refrigeration and can be kept at room temperature for indefinite periods of time without undergoing deterioration. Bond and Wright[16] and also Mahoney[17] have obtained satisfactory results with reconstituted serum and plasma in hemorrhage and traumatic shock in lower animals. However, Buttle and his co-workers[8] obtained unsatisfactory results with the reconstituted serum and plasma which they transfused into cats subjected to severe hemorrhage. Their results from undried serum and plasma in the same experiments were definitely superior. Relatively few reports are available on the results of the use of dried serum and plasma in human beings. If the reconstituted plasma (Strumia et al.[18]) or serum (Best[19]) was of normal concentration, no reactions were noted in human beings by these workers. However, Brown and Mollison[20] reported 34 mild reactions in 202 transfusions of dried serum and eight reactions in 30 dried plasma transfusions. The transfusion of concentrated (two to four times normal) reconstituted serum or plasma is also followed by reactions. Brown and Mollison[20] noted 19 reactions in 91 transfusions. These reactions consisted of fever, vomiting, urticaria and lumbar pain. They found a high incidence of thrombosis of the injected vein when four times normal serum was used. Recently Mahoney and his co-workers[21] administered reconstituted dried plasma and found an incidence of 3.5 per cent in 340 transfusions. Some discussion has arisen as to the amount of plasma or serum which should be administered, and attempts have been made to determine this by means of various formulas. Such formulas are based upon a calculation of the blood volume of the patient. Bushby and his co-workers[22] have determined the hematocrit reading following transfusion of a known volume of plasma; for example, if a transfusion of 1,000 c. c. of plasma caused a change of the hematocrit reading from 50 mm. to 40 mm., the blood volume would equal 4000 c. c., which is obtained by the following calculation: $V = \frac{1000 \times 40}{50 - 40}$. It is obvious that all such formulas for the estimation of the blood volume in shocked subjects are vitiated by the fact that the reduction of blood volume continues while the test substance is being injected. The treatment of air-raid casualties in Britain has demonstrated the fact that it is useless to rely upon small amounts of plasma or serum. This fact has been stressed by various workers. An initial injection of 500 c. c. of plasma or serum should be given to a patient suffering from hemorrhage or shock. Thereafter, amounts up to 2,000 c. c. may be required, depending upon the behavior of the blood pressure and hematocrit readings. In patients suffering from burns, very large amounts of serum or plasma are often required.

ASCITIC FLUID

An inexpensive source of human protein is ascitic fluid which is removed from patients suffering from cirrhosis of the liver or cardiac failure. The transfusion of human ascitic fluid will elevate and maintain the blood pressure of dogs subjected to hemorrhage (Davis and White[23]). Such fluid has been transfused successfully in human beings (Davis and Blalock[24]). It has been administered with satisfactory results to patients suffering from burns (Maes and Davis[1]) and from hypoproteinemia (Davis and Getzoff[25]). The total protein content of ascitic fluid varies from 1.5 grams per cent to 2.5 grams per cent. Reconstituted dried ascitic fluid has been administered successfully to dogs suffering from severe hemorrhage (Mulder et al.[26]).

INCOMPATIBLE ISOAGGLUTININS IN PLASMA, SERUM, AND ASCITIC FLUID

Group-specific isoagglutinins are present in plasma, serum, and ascitic fluid. At times the titers of such isoagglutinins may be dangerously high and may lead to transfusion reactions. To obviate the danger of reactions from antagonistic isoagglutinins

the following procedures have been used: (1) Pooling of plasma and serum, usually eight to 16 in number (Edwards et al.[27]; Levinson and Cronheim[28]); (2) dilution of plasma (Strumia[18]); (3) mixture of equal quantities of fluids containing a and b isoagglutinins (Davis[29]); (4) addition of boiled saliva from group B individuals to serum from group A blood (Jakobowicz and Bryce[30]). In most instances the transfusion of incompatible serum or plasma will not result in agglutination of the red blood cells of the recipient, since the transfused isoagglutinins will be diluted by the body fluids of the recipient. However, if the titer of incompatible isoagglutinins is very high the inactivation by the recipient may be inadequate. Davis[29] has transfused incompatible ascitic fluid into human beings without reactions which could be attributed to agglutination of the red blood cells of the recipient.

The indiscriminate pooling of serum or plasma without knowledge of the groups of the constituents of the pool does not protect against the occasional occurrence of a pooled fluid possessing a high titer of a or b isoagglutinins. This is exemplified by the near fatal reaction reported by Polayes and Squillace[31] following the transfusion of dried pooled human plasma. Mayner[32] has reported a death following the use of plasma containing fibrin clots. In this case the plasma was not adequately filtered and the fatal outcome resulted from the formation of fibrin emboli in the lungs. The Rh factor remains to be considered as a possible cause of reactions following the use of plasma or serum. It is possible to have a reaction when plasma or serum containing anti-Rh agglutinins is administered to a patient whose blood is Rh-positive. Up to the present time, to our knowledge, no report describing such a reaction has appeared.

BOVINE SERUM AND DERIVATIVES

The high cost of production of human serum and plasma has led to an inquiry into the possibilities of using heterologous serum and plasma. Wangensteen[33] and his co-workers transfused bovine plasma into human beings and reported a high incidence of post-transfusion reactions. Since these reactions resembled those following the injection of a foreign protein, it occurred independently to several groups of workers to remove the globulin fraction from the serum and plasma (Janeway and Beeson[34]; Keys et al.[35]; Davis et al.[36, 37]). Davis and his coworkers[36, 37] found that bovine serum albumin is an effective blood substitute and can elevate and maintain the blood pressure of dogs subjected to severe hemorrhage. Bovine serum globulin was found to be definitely toxic to dogs. These workers transfused bovine serum albumin into human beings without the production of reactions.

HORSE SERUM AND DERIVATIVES

Little work has been done on the possible use of horse serum and its derivatives as substitutes for blood in heterologous species. Davis and Eaton[38] have made a comparative study of the effects of the transfusion of horse serum, horse serum albumin, and horse serum globulin in dogs subjected to severe hemorrhage. They found horse serum albumin to be the most effective blood replacement fluid of these three. Much work remains to be done in this field. The use of heterologous serum and plasma protein is still in the experimental stage.

ARTIFICIAL BLOOD SUBSTITUTES

Various artificial substitutes for blood have been proposed. Gum acacia, which was introduced by Bayliss,[39] is a colloidal carbohydrate. Gum acacia has been used extensively as a blood substitute in man and in lower animals. It appears to be effective in maintaining the blood pressure after hemorrhage. However, it is excreted very slowly from the body and may accumulate in the liver, causing an interference with its ability to regenerate plasma protein. Moreover, it is slightly antigenic. Another colloidal carbohydrate — pectin — has been introduced as a blood substitute by Hartman and his co-workers.[40] Pectin is prepared in a 0.5 solution in 0.9 per cent sodium chloride solution. The solution is buffered to pH 7.2. These workers have

obtained satisfactory results with this material in lower animals subjected to various types of shock. They have also injected this solution into human beings. The preliminary work of these investigators suggests that pectin is not antigenic and that it does not accumulate in the body. However, further experimental work would seem to be indicated before conclusions can be reached regarding this material. Still another type of blood substitute, gelatin, which is a derived protein, was introduced by Hogan and Fischer[41] in 1912. The use of this material was abandoned when it was found that not only did it leave the blood stream very rapidly but that it was also antigenic. Recently, Taylor and Waters[42] have suggested the use of fish gelatin (isinglass) which is obtained from the swimming bladders of fish. They have obtained encouraging results in animal experiments and state that it is non-antigenic.

The artificial blood substitutes which we have discussed present this common disadvantage, that they cannot be utilized by the body. For this reason, they cannot serve in any way to restore either the hemoglobin or the plasma proteins of the blood. The use of amino acid mixtures for the treatment of hypoproteinemia (Elman[43]) is based upon the work of Whipple and his co-workers.[44] Such mixtures are obtained by the hydrolysis of casein and are able to maintain nitrogen equilibrium in man and in lower animals when given by vein or subcutaneously. It is, of course, unnecessary to point out that amino acid mixtures leave the blood stream very rapidly and are therefore not suitable for the replacement of blood volume in conditions of shock.

SUMMARY

A brief consideration has been given of recent advances in our knowledge of blood substitutes. The importance of these studies in relation to clinical practice is emphasized. One conclusion is possible; namely, that the ideal blood substitute has not yet been found.

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DISCUSSION

Dr. Mims Gage (New Orleans): When Dr. Maes gets through presenting a subject there is little left to be said by anyone else.

The use of blood substitutes and the effort of finding one has been gone over, as he said, for many years and the paradox of it is that we have been carrying this around in our own bodies all of the time. It is necessary sometimes to use certain quantities and frequently we have to have large quantities. At one time we relied on saline or glucose but that did not maintain blood volume. That is what we have been looking for for years; something to maintain blood volume. From typing blood we were able to use blood when found. Frequently it happens that in emergency cases it is impossible to get blood donors of the right type and stored blood is all right for a certain time.

Good pool plasma, as he said, causes very few reactions in the human body. Whether there is loss of blood or not the patient can be treated with plasma.

It is very difficult for us to get plasma. It is difficult for us to have it here in the city. The Army, from accounts, has been having a large number of donors and has a large amount of plasma. Occasionally a person will need a large supply of plasma. The Research Council shows that people who have been burned, where 10 per cent of the surface is burned, require 1000 c. c. of plasma.

Efforts have been made to find a method to use animal plasma, especially bovine, where large quantities of blood can be obtained at slaughter houses. At first there was some reaction but recently they have been able to purify it to such a degree that there is no reaction present.

The Army recently adopted this and make it very cheaply and I am sure we have a great deal to look forward to in emergencies, when we can get all the bovine crystalized albumin necessary to maintain normal blood volume in shock from hemorrhage and trauma. This is one of the greatest things that has been advanced in blood substitutes and is now being produced by the Army.

Dr. Harry A. Davis (in closing): I must agree with Dr. Gage in regard to discussing the presentation which Dr. Maes has just given us. He covered the field so completely that there is little to add; this is particularly so after what Dr. Gage has said.

There are one or two points which I should like to stress. As you all know, human serum or plasma is very expensive. This has resulted in the use of bovine and horse serum albumin. The work described by Dr. Gage has emanated from the Harvard Medical School. This work, which has been going on over a period of some time, has resulted, according to what Dr. Gage said, in the production of an albumin which has properties somewhat similar to human serum albumin. Since we are working on this problem in the Department of Surgery at L. S. U., we are very much interested in knowing what progress Dr. Cohn has been making.

We have been using plasma obtained from horse blood. This has an advantage over bovine blood in that it can be obtained under relatively

aseptic conditions. You can bleed the horse and remove one or two quarts of blood without hurting the animal. So far we have not made sufficient progress in this to report it at this time. Should this material of Dr. Cohn's be adequate to act as a substitute for blood, I think we should all congratulate ourselves in view of the fact that a need for such a substitute is very great, particularly at this time.

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SYMPOSIUM ON ANESTHESIA*
THE PHARMACOLOGIC BASIS OF THE SELECTION OF ANESTHESIA

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The formulation of a definite routine in the selection of anesthesia is complicated by a number of variable factors. Consequently, each case presents an individual problem. In the not so distant past, the choice of the drug and technic of administration were no problem because the number of available agents were limited, technics of administration were rudimentary, and the pharmacologic responses other than the immediate anesthetic action were little studied or understood. Surgical procedures were less complex and the criterion of a satisfactory anesthesia was a completely relaxed and unconscious patient. Advances in surgical technics have paved the way to intrathoracic, intracranial, intramediastinal, and other more complex types of surgery. These advances and the recognition of the importance of physiology in surgery have compelled surgeons to become cognizant of more than the narcotic effects of anesthetic drugs. Newer agents and methods of administration have been introduced as a result.

The fact that anesthetic drugs can exert profound physiologic and biochemical changes is now well recognized. Consequently, in choice of anesthesia the foremost consideration is their pharmacologic effects. Pharmacology, however, is concerned primarily with changes of normal function induced by drugs. Most patients who are to be anesthetized have some physio-pathologic change as a result of their disease. This, too, complicates the problem. In addition, other underlying pathology may further complicate the picture. The effects of surgical manipulations, traumatic reflexes, posture, hemorrhage, and fluid loss, may contribute additional and often unpredictable physiologic changes. The skill, dexterity, and temperament of the operator are always considered by the anesthetist when selection of the agent and technic are at his discretion. On the other hand, in those instances where the surgeon relies on a technician as an anesthetist and he, himself, assumes the responsibility for the anesthesia, his selection is influenced by the skill and capability of the particular technician. Assuming the anesthetist and surgeon are both competent and the effects of the surgical procedure are minimal, one may select the drug on the basis of pharmacologic effects and their relationship to the presenting pathology.

TYPES OF ANESTHESIA

The following types of anesthesia, classed according to the routes of administration of the drugs, are at our disposal—inhalation, intravenous, rectal, and regional. Regional, in this discussion, includes infiltration, nerve blocks, and spinal (subarachnoid) block.

Inhalation general anesthesia, still the most reliable and controllable, is induced and maintained with gases or vapors of low-boiling liquids. Three useful gaseous anesthetic drugs are available—nitrous oxide, ethylene, and cyclopropane. Nitrous oxide and ethylene possess almost equal potency and similar pharmacologic effects. The third, or surgical stage of anesthesia, is, for the sake of convenience, divided into four strata or planes which can be readily identified by changes in the nervous, circulatory, and respiratory systems. Neither nitrous oxide nor ethylene is sufficiently potent to produce anesthesia of greater depth than first plane unless reinforced by another drug. First plane anesthesia is

*Read before the Orleans Parish Medical Society, February 9, 1942.

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satisfactory for superficial operations but is not accompanied by any degree of muscular relaxation. Cyclopropane, on the other hand, is sufficiently potent for anesthesia in any plane. The concentration necessary for adequate anesthesia is high for both ethylene (80-85 per cent) and nitrous oxide (85-90 per cent). Unless adequate premedication is used, a certain degree of anoxia accompanies anesthesia with these agents. Anoxia, superimposed upon nitrous oxide or ethylene anesthesia, may be followed by respiratory and circulatory failure and transient or even permanent damage to the central nervous system. Accidents with these agents are as a rule the result of asphyxia produced by too great a reduction of oxygen tension. Individuals not familiar with the pharmacology of these gases expect from them a depth of anesthesia which they are incapable of producing. If adequate oxygen tension cannot be maintained it is best to fortify these gases with ether or some other more potent agent. Cyclopropane, because of its greater potency, is more satisfactory than either nitrous oxide or ethylene. Inasmuch as the concentration for surgical anesthesia is low (20-30 per cent), the remainder of the inhaled mixture may be oxygen if one wishes it. Adequate oxygenation is, therefore, easily maintained. Controversy exists regarding the inhaled concentration of cyclopropane lethal to man. A 40 per cent concentration produces arrest of respiratory movements followed by circulatory failure and death unless artificial respiration is instituted. The drug possesses a wide margin of safety. Cyclopropane, unlike nitrous oxide and ethylene, is sufficiently potent to abolish reflexes and provide relaxation for abdominal surgery. Induction and recovery are rapid with all three gases. Unconsciousness is obtained within two or three minutes. Recovery is equally rapid with nitrous oxide and ethylene but a somewhat longer interval follows cyclopropane, sometimes as long as ten minutes.

The general systemic effects of these gases are negligible as a rule if not complicated by anoxia. They are non-irritating to the membranes of both the upper and lower respiratory tract, produce little or no secretions, and consequently are ideal in subjects with acute or chronic diseases of the respiratory tract. Cyclopropane, particularly, is best in these conditions as adequate oxygenation is assured. Nitrous oxide and ethylene without anoxia cause no deleterious circulatory effects. Anesthesia complicated by anoxia is accompanied with rises in blood pressure, increased cardiac irritability and changes in rhythm, and other circulatory disturbances. Cyclopropane anesthesia, however, even with adequate oxygenation may be accompanied by circulatory disturbances. A variety of arrhythmias ascribable to an increase in irritability of the automatic tissue of the heart is seen, particularly in the deeper planes of anesthesia. Whether or not a patient with cardiac disease should have cyclopropane is controversial. Patients with cardiovascular diseases have been anesthetized with cyclopropane without any apparent ill effects but deaths suggestive of cardiac failure due to cyclopropane have been recorded. This point requires further study and the last word regarding it has not been written. It is perhaps best to err on the side of conservatism and omit the drug in patients with proved cardiac diseases. Epinephrine and related amines, such as synephrine or neosynephrine, used simultaneously with cyclopropane further increase cardiac irritability and give rise to arrhythmias. In dogs such a combination produces ventricular fibrillation. The combination may be equally as dangerous in man also and should be carefully avoided. Pressor effects, particularly rises in systolic pressure, occasionally accompany cyclopropane anesthesia. These frequently disappear during the course of anesthesia. Clinicians and laboratory investigators cannot state exactly the causes of these rises in blood pressure but feel they are due to complicating factors, such as carbon dioxide excess, and so on, and not to the cyclopropane itself. Cyclopropane is not contraindicated in uncomplicated essential hypertension. The more pronounced rises occur

in subjects with normal tension or mild hypertension.

No significant changes in the chemical constituents of the blood are caused by these gases. Anesthesia complicated by anoxia, however, lowers carbon dioxide combining power, raises blood glucose levels, depletes the liver of glycogen, and disturbs the function of this organ. Hepatic and renal function are ordinarily not disturbed by these drugs.

Nitrous oxide is a non-inflammable inorganic gas; ethylene and cyclopropane are both hydrocarbons which form explosive mixtures with air or oxygen. Nitrous oxide mixed with ether, cyclopropane, or other combustible organic gases and vapors, readily parts with its atom of oxygen and aids combustion should the mixture be ignited.

The currently used volatile liquids include the two halogenated hydrocarbons, chloroform and ethyl chloride, and the two ethers, ethyl ether and vinyl ether or vinethene. The effective inhaled concentrations of vapors of these liquids are lower than those of the aforementioned gases. Adequate oxygenation is allowed even when air is the source of oxygen. Chloroform is the most potent of these and possesses the narrowest margin of safety. A 1½ per cent inhaled concentration produces surgical anesthesia. A 2 per cent inhaled concentration produces respiratory failure. With ether, a 3 to 4 per cent concentration maintains surgical anesthesia; a 7 to 8 per cent concentration produces respiratory failure. Ether possesses a wider margin of safety than chloroform. Vinethene concentrations are comparable to those of ether. All planes of anesthesia may be obtained with these volatile drugs, although depth is difficult to control with vinethene and ethyl chloride. Chloroform and ether are sufficiently potent to cause abolition of reflexes and provide excellent muscular relaxation. The volatile drugs are more irritating to the membranes of the upper and lower respiratory tract than the gases. Secretions are more abundant and occur more frequently, particularly with ether and vinethene. Irritation is more pronounced with ether than with the three gaseous drugs. In view of these effects on the membranes, their use in inflammatory diseases of the respiratory tract is objectionable. Respiration is stimulated by all these drugs. Perhaps, as explained by Schmidt, the stimulation is an expression of an obtunded cough reflex. The quiet respiration observed with cyclopropane is not seen with ether and the other drugs.

The effects of ether and vinethene on the cardiovascular system are negligible. Ether, from the standpoint of effects on the heart muscle itself, is the best of the available anesthetic agents in cardiac disease. Arrhythmias are less common and less serious when they do occur. The deleterious effects of chloroform on the heart have been so frequently emphasized that one need not mention details here. Ethyl chloride has somewhat the same effects on the cardiovascular system as chloroform, and, like chloroform, is strictly contraindicated in cardiac disease.

Chemical changes in the blood are more pronounced with the volatile drugs than with the gases. A marked fall in carbon dioxide combining power accompanies ether and chloroform anesthesia. The mechanism of this acidosis is not understood, but within a few minutes after induction the disturbance of the acid-base balance appears and persists for several hours after the drug is discontinued. Blood glucose levels are elevated, sometimes over 100 per cent. This disturbance in carbohydrate metabolism and acid-base balance may be interrelated. The increase in glucose, so prominent during ether and chloroform anesthesia, is probably the result of the depletion of glycogen content of the liver. Chloroform and ether decrease liver function, as determined by the excretion of bromsulfalein. On rare occasions, following chloroform, a hepatitis characterized by a central necrosis of the liver, jaundice, fever, and increased amino acids in urine may be seen. Hepatic and renal damage have also been observed in dogs following repeated administrations of vinethene or administrations

accompanied by anoxia. The occurrence of similar lesions in man may be a possibility. A temporary oliguria followed by a compensatory polyuria occurs after ether and chloroform administration. The nitrogenous constituents rise during but fall after the anesthesia. A transient albuminuria may follow in almost half of ether and chloroform anesthesias. These volatile drugs are contraindicated or are used with extreme caution in acidosis, diabetes, and diseases of the liver and kidney.

The volatile agents have a definite inhibiting effect on smooth muscle. Gastric, intestinal, and uterine motility are inhibited. Bronchial musculature is relaxed by ether, chloroform, and vinethene. Some investigators believe anesthetics stimulate portions of the autonomic nervous system. Ether and chloroform are believed to be sympathetic stimulants, cyclopropane parasympathetic. The effect on smooth muscle may be due to this stimulation.

Induction and elimination time of the volatile agents vary. Induction is slowest with ether; first, because it is so irritating and must be given gradually; and second, because the blood-air ratio is high (15/1), so that a high partial pressure is essential during induction to saturate the blood. The blood ether is eliminated slowly because of this high blood-air partition. The water solubility is high so that the watery as well as lipoid tissues absorb it freely and eliminate it slowly. Chloroform, ethyl chloride, and vinethene have lower blood-air ratios and are poorly soluble in water. Their elimination from blood and water is more rapid. Induction with ether, even in expert hands, may consume fifteen minutes. Nitrous oxide, ethylene, vinethene, and ethyl chloride, which are easily inhaled and produce anesthesia within one or two minutes, are used preliminary to the ether to accelerate the induction. The patient is anesthetized first with these so that he may tolerate higher concentrations of ether. Ethyl chloride, widely used as an inducing agent for "open drop" ether, is objectionable because of its cardiac effects. Vinethene, equally as rapid and effective in its action, is far safer and should replace ethyl chloride as a preliminary to ethyl ether in the "open drop" method.

The vapors of these liquids, with the exception of chloroform, are all inflammable. Chloroform with air or oxygen, however, is oxidized to phosgene by flames, sparks, and cautery.

The advantage which inhalation anesthesia possesses over all others is its controllability. Both the gaseous and volatile agents are chemically inert in the body and are eliminated entirely unchanged by the lungs. The concentration can be gradually increased or decreased so that depth may be varied at will or the drug entirely eliminated by using artificial respiration when overdosage occurs.

Gases must be administered by mechanical appliances. These are composed of meters for gases, vaporizers for volatile liquids, an oxygen supply, and chemical absorption units or other devices to remove carbon dioxide. The closed systems with rebreathing allow a smoother, more even anesthesia and better physiologic control of oxygen and carbon dioxide tensions as well as economy from enclosure of the mixtures. Open methods of vaporization, while safer in inexperienced hands, are not necessarily the best. They are wasteful, are accompanied by uneven anesthesia, poor carbon dioxide control, poor oxygenation, and lowering of body temperature.

INTRAVENOUS ANESTHESIA

Intravenous anesthesia is becoming increasingly popular. The ultra-short-acting barbiturates are the best available drugs for administration by vein. Numerous drugs have been prepared and tried but only two are popular, evipal and pentothal. The simplicity of the intravenous route for administration of drugs, unfortunately, has made general anesthesia available for administration by individuals unfamiliar with the management of complications of anesthesia. It has also encouraged the use of general anesthesia under circumstances and in places where its use is not judicious. The technic, perhaps inadvertently, is frequently selected from the standpoint of the con-

venience of the operator rather than the safety of the patient. Intravenous anesthesia, like all other forms of anesthesia, has its own place in skilled hands. This method of drug administration is not controllable, for once the estimated dose has been injected, should any untoward reaction develop the drug cannot be removed and one must rely upon the mechanisms of detoxification and stimulating drugs. The variation in susceptibility of different individuals to hypnotic drugs does not allow accurate judgment in doses of drugs. Barbiturates are particularly unreliable in this respect. Recovery from the anesthesia with pentothal and evipal is prompt by virtue of the supposed rapid detoxification in tissues. Although it is generally accepted that the liver is the site of destruction of short-acting barbiturates, some evidence exists that pentothal may also be destroyed by other tissues, such as blood plasma and muscles. Ten minutes after injecting an anesthetic dose of pentothal into a dog, it is not detectable in tissues even though hypnosis persists. The pentothal is believed to be partly detoxified almost immediately, but the resulting degradation products remain in the tissues and produce the somnolence which follows recovery from the anesthesia. The usually recommended dose of both of these barbiturates is 1 gram which may provide anesthesia for 20 to 30 minutes, depending upon the individual's susceptibility. A prolonged, undesired, postanesthetic somnolence may accompany the administration of more than one dose. Usually, the operation is made to fit the anesthesia, rather than anesthesia the operation. The signs and depth of anesthesia with these barbiturates are difficult to evaluate. One cannot judge depth by planes as with inhalation anesthesia. The activity of certain reflexes, such as those of the eye, cannot be used as guides with these agents as with inhalation anesthesia. The patient has "enough" as long as he does not stir and pulse and respiration are well maintained, and "too much" if respiration fails. The procedure for administration is somewhat like a sailor steering a ship by "dead reckoning." All reflexes are not completely abolished. Laryngeal and pharyngeal reflexes do not disappear. Coughing, stridor and laryngeal spasms are common and cause considerable difficulty in maintenance of free airways and render the technic useless for operations about the neck, pharynx, larynx, or for bronchoscopic studies. A marked depression of respiration accompanies the anesthesia. Blood pressure may fall as a result of depression of vasomotor centers and pulse rate increase. Muscular relaxation is rarely satisfactory. On occasions, the superficial reflexes are not abolished, so that involuntary muscle contractions, twitchings, and fibrillations are common. Attempts of inexperienced individuals to abolish these reflexes completely may lead to overdosage. Acute or chronic respiratory diseases, cardiovascular diseases, the extremes of age, anemias, toxemias, metabolic diseases, liver diseases, are contraindications to either pentothal or evipal.

RECTAL ANESTHESIA

Rectal anesthesia is popular in certain sections of the country. Drugs satisfactory for rectal anesthesia are few in number. The tri-halogenated ethyl alcohols are the most effective available substances. Tribromethanol, a white powder, dissolves in amylene hydrate to form the popular "avertin fluid." The recently introduced trichlorethanol is a liquid possessing approximately the same hypnotic properties as tribromethanol, but is still in the experimental stage. Rectal anesthesia, like intravenous, is also uncontrollable. Ten minutes after the administration of avertin, a deep hypnosis appears which lasts several hours if the patient is not stimulated. Stimuli rouse him since the afferent pathways to the cortex are not completely blocked. The use of a supplemental inhalation or local anesthesia is imperative completely to abolish reflexes. The hypnosis is not a complete anesthesia but is often referred to as "basal anesthesia." A considerable depression of respiration may follow administration of avertin, which, even though no effect is sustained upon the epithelium of the respira-

tory tract, contraindicates its use in respiratory diseases, particularly if vital capacity is lowered. Pharyngeal and laryngeal reflexes remain active unless a supplemental agent is used. A depressor effect causes a fall in the systolic blood pressure shortly after administration. Although the compound is a halogenated alcohol it does not possess the cardiac effects of chloroform as many erroneously believe. The effect on respiration and arterial tension contraindicates its use in cardiovascular diseases. Blood glucose levels are elevated, combining power is lowered, and liver function decreased. A temporary oliguria followed by a compensatory polyuria is common. Both tribrom- and trichlorethanol are detoxified by the liver by conjugation with glycuronic acid and the conjugated product is excreted by the kidneys. The drug is contraindicated in diabetes, acidosis, shock, dehydration, liver and kidney diseases. It cannot be used in rectal or colonic operations because of the method of administration. Avertin is useful in psychically disturbed individuals, and in convulsive states (such as tetanus). Avertin is popular in neurosurgery because unlike the other hypnotic and anesthetic drugs it causes little or no increase in intracranial pressure. Local or general anesthesia must be used as supplementals with this as with other types of operative procedures.

REGIONAL ANESTHESIA

Regional anesthesia may be used in psychically suited subjects in which inhalation and other types are not desired or contraindicated. Injection of a local anesthetic drug, particularly when used with vasoconstrictor substances such as epinephrine, into tissues for infiltration or nerve block may be contraindicated where recuperative powers are poor (as in diabetes), when infection exists, or where the blood supply is poor as a result of diseases of the peripheral vessels (as in arteriosclerosis, Raynaud's disease, and thrombo-angiitis obliterans). Spinal, or subarachnoid, block may be contraindicated in certain systemic diseases, as it may be accompanied by serious physiologic disturbances. Subarachnoid block is also uncontrollable and the duration of action variable and nonpredictable. The muscular relaxation obtained, however, is difficult to duplicate by any other technic. This feature and the fact that the anesthesia can be induced by the surgeon himself are responsible for the popularity of the block. One differentiates between "high spinal," in which the effects of the block extend above the costal margin usually accompanied by intercostal paralysis, and "low spinal," which is anesthesia below the diaphragm with no intercostal paralysis. The complication which occurs most frequently during spinal anesthesia is the circulatory depression manifested by varying degrees of falls in blood pressure. The mechanism causing this fall has been the subject of much study and controversy. The generally accepted older belief is that a stagnation occurs from arteriolar dilatation from paralysis of sympathetic fibers. Recent work indicates that the arterioles of the viscera are endowed with an autonomous control and the fall in blood pressure results from capillary and venous failure due to the relaxation and loss of tone of the muscles and decreased venous return to the heart. The circulatory changes in unoperated man are characterized by a fall in systolic pressure, a well maintained diastolic, decrease in pulse pressure, fall in venous blood pressure, and a bradycardia. The bradycardia (not as apparent when ephedrine is used) is the result of sympathetic paralysis and predominance of the vagi which remain active. A reduction in cardiac output, a prolongation of circulation time, and a widening of the arteriovenous difference are other circulatory changes. The widened arteriovenous difference may enhance tissue anoxia. Changes in blood volume, blood viscosity, and hematocrit readings are slight. Vasoconstrictor drugs effectively combat this circulatory collapse which differs from shock. In the latter condition fluid volume is reduced, hemoconcentration, increased blood viscosity, and decreased blood volume occur. Circulatory collapse during spinal anesthesia occurs more frequently in sub-

jects with cardiovascular diseases, such as hypertension or arteriosclerosis. Any drug or procedure which may insult the circulatory system, as does spinal anesthesia, obviously is contraindicated in subjects with cardiovascular disease. "High spinal" anesthesia certainly should never be used. Although nothing is inhaled and irritation of tissues of the respiratory tract is absent, postoperative respiratory complications are as frequent in this type of anesthesia as in general. Statistics show that a higher incidence accompanies "high spinal." The reduction of minute-volume exchange, which may accompany intercostal paralysis, particularly in operations about the diaphragm, contraindicates its use where there is reduced vital capacity. Decreases in renal and hepatic function and change in blood chemical constituents during spinal anesthesia are insignificant. Septicemia and central nervous system diseases (particularly those involving the spinal cord) are contraindications for this type of block. The relative toxicity if the accepted drugs are employed is unimportant since the amounts used are small. The extent, intensity, and duration of the physiologic changes are the important considerations. Anesthesia induced with procaine lasts approximately one hour, metycaine one and a half hours, pontocaine two or more hours, and nupercaine two and a half to as long as five hours.

MEDICATION PRIOR TO ANESTHESIA

Satisfactory anesthesia cannot be administered without premedication. The needs for premedication are fourfold: (1) to induce psychic sedation and minimize excitement; (2) to decrease metabolism so that less oxygen is required—a necessity for nitrous oxide and ethylene; (3) to diminish mucous and other secretions; and (4) to provide prophylactic effects against some anticipated undesired action of a drug other than the anesthetic action. The alkaloids derived from opium, particularly morphine, dilaudid and pantopon solutions, best provide psychic sedation and desired suppression of metabolism. Barbiturates are not satisfactory substitutes for the opium alkaloids because they do not decrease the metabolic rate, but they may be used as an adjunct for psychic sedation since they depress the cortex. Scopolamine and atropine, both drugs of the belladonna group, adequately eliminate objectionable secretions. Both have a stimulating action upon the central nervous system but paralyze the myoneural substance of the parasympathetic nerve endings. The period of cortical stimulation due to scopolamine is brief. It is followed by a cortical depression (not so with atropine) which is desirable when combined with the cortical effects of morphine. The medullary stimulation persists. The peripheral effects of scopolamine are twice those of atropine. Scopolamine and hyoscine are identical. Neither atropine nor scopolamine is a habit-forming drug. The doses of premedicating drugs vary with the metabolic rate. Higher doses are tolerated when the metabolic rate is high, at puberty, in fever, and thyrotoxicosis. Old people, therefore, require smaller doses. The optimum scopolamine-morphine ratio has been found to be 1/25. Thus, the average dose is 1/100 grain to 1/4 of morphine. The optimum time for administering has been found to be one to one and a half hours before induction of anesthesia. The practice of ordering premedication "on the stretcher" or "on call" should be discouraged because the drugs rarely accomplish the purpose for which they were intended. Premedication in this manner is almost the equivalent of no premedication at all. Premedication is as necessary in regional as in general anesthesia. Psychic sedation is essential for complete success of the block. Besides, in event of failure of the block, the patient is prepared for general anesthesia. Many anesthetists omit the opium alkaloids in premedication for avertin or intravenous anesthesia with barbiturates because of accentuation of the respiratory depression characteristic of these drugs.

Barbiturates, preferably the short-acting type, such as nembutal or seconal, are given before the administration of all local anesthetic drugs as a prophylaxis in the event of rapid absorption or toxic response, or to

minimize the effects of an accidental intravenous injection. Therapeutic doses, orally administered one hour before anesthesia, are recommended.

Ephedrine by intramuscular injection (3/4 grain) is used prophylactically before induction of spinal anesthesia to forestall the expected fall in blood pressure. Many anesthetists withhold ephedrine and administer it only if a blood pressure fall seems imminent. Atropine in therapeutic doses (1/150 gr.) is given preliminary to intravenous anesthesia to minimize vagal effects and reflexes in the trachea, larynx, and bronchi.

SUMMARY

The different types of anesthetics have been reviewed from the point of view of their pharmacologic action and of their availability for various operations.

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ANESTHESIA IN HEART DISEASE

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The question of the advisability and the choice of anesthesia in the presence of organic heart disease is one that has received frequent consideration. The problem has many phases that must be considered separately.

At the outset, it must be assumed that the diagnosis is correct and that there is a definite indication for operation. One has only to consider a few situations to realize that symptoms and signs may arise in a patient with organic heart disease which will mimic acute surgical conditions although they are entirely cardiac in origin and should be managed medically. Many of us have seen rightsided abdominal pain with tenderness, rigidity, fever, nausea, leukocytosis and even jaundice resembling acute appendicitis or cholecystitis due to rightsided cardiac failure with congestion of the viscera in a patient with organic heart disease. Or an acute coronary occlusion or dissecting aneurysm may produce the signs and symptoms of an acute perforated peptic ulcer, pancreatitis, intestinal obstruction, cholecystitis, cholelithiasis or diaphragmatic hernia. In children with acute rheumatic fever there may be acute abdominal pain with nausea, vomiting, fever, leukocytosis and localized tenderness very difficult or even impossible to differentiate from acute appendicitis. Since it is likewise possible for a chronic cardiac to have such acute surgical complications or for acute surgical conditions to imitate cardiac emergencies, the differential diagnosis is most important and not always easy. An evaluation of the presence or absence of cardiac signs with the additional information furnished by such procedures as circulation time, venous pressure, x-ray and the electrocardiogram is usually necessary. This calls for the close cooperation

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of the internist and surgeon in such matters.

When it becomes evident that a surgical problem exists in a patient known to have cardiac disease, the desirability of the surgical procedure must be determined. How necessary is an operation? What will it do for the patient? Will the successful operation increase the life expectancy of the individual? These questions must be carefully considered and decided. Of course if a surgical emergency exists, no choice exists and one must then decide what can be done to assist in its successful execution. Between the completely elective procedure which involves too much risk in the particular cardiac patient without offering sufficient benefit and the emergency procedure which is a matter of life or death, there lies a great group where the decision is perhaps most difficult. Some patients with serious organic heart disease may be improved as to their cardiac status by operation, such as thyrocardiacs, or in coronary arteriosclerosis with angina and complicating chronic cholecystitis of cholelithiasis, not to mention of course the cardiac surgery itself in constrictive pericarditis or patent ductus arteriosus. The risks for or against an operation must be carefully weighed and require a careful evaluation of the cardiac status of the individual. Some of these factors will be considered subsequently.

If the patient with heart disease is to be operated upon, everything must be done to minimize the risk involved. This calls for careful preoperative preparation and treatment if possible, proper choice of an anesthetic by a competent anesthetist, good surgery and adequate postoperative observation and management. Here again it is imperative that there be close cooperation between the internist, the surgeon and the anesthetist.

There are certain types of cardiac abnormalities which greatly increase the risk of operation. Patients with congestive heart failure regardless of etiology or degree, coronary arteriosclerosis with or without angina pectoris, recent coronary occlusion with myocardial infarction, bundle branch block, complete heart block, persistent pulsus alternans and syphilitic aortic disease all are markedly increased surgical risks. In this type of patient operation should be avoided or postponed if possible. If the operation can be postponed, the congestive failure may be treated and improved. At least three months should elapse after a coronary occlusion with infarction, for that is considered the usual time for myocardial healing to occur. It is difficult or impossible to determine the best time to operate upon a patient with angina pectoris, because of course the individual may have an attack or a coronary occlusion at any time and begins with an insufficient coronary circulation. The same is true of patients with evidence of coronary arteriosclerosis without angina, but showing bundle branch block or complete heart block in the electrocardiogram. These patients may be rather easily overlooked since they may have few or no symptoms and signs of cardiac disease. The patients with complete heart block may well have an Adams-Stokes attack. The presence of persistent pulsus alternans is evidence of serious myocardial damage and the individual with syphilitic aortic disease, because of involvement of the coronary ostia, presents the same risks as the coronary arteriosclerotic group.

In the absence of these serious cardiac conditions, the presence of other cardiac abnormalities does not necessarily increase the surgical risk. With evidence of hypertension, chronic valvular disease of rheumatic, congenital or arteriosclerotic origin, and cardiac arrhythmias such as auricular fibrillation, auricular flutter or premature contractions, the patient may be operated upon without much increased risk, providing the circulation is efficient and the anesthesia and operation are skillfully executed. The state of the myocardium is here the important consideration, and this is determined by the ability of the patient to carry on ordinary activity without evidence of circulatory embarrassment. Here the symp-

toms are very important to determine the presence or absence of cardiac failure, then the signs of such failure, and of least importance the x-ray and the electrocardiogram. An electrocardiogram taken to determine the preoperative status of a patient is of no value unless correlated with a proper history and physical examination.

Hypertension does not greatly increase surgical risk alone. However, when it is associated with chronic nephritis the mortality is said to increase from about 4.9 per cent in non-nephritic to 15 per cent in nephritic patients.

Chronic valvular defects are relatively unimportant if myocardial efficiency is satisfactory. The only exception to this statement is the presence of mitral stenosis which might cause emboli as the result of sterile mural thrombi present. Auricular fibrillation may also give rise to the same complication for that reason.

In a well compensated patient with cardiac disease, a surgical procedure apparently places no increased burden upon the heart if the patient is properly prepared, is efficiently anesthetized and skillfully operated upon. The burden of operation under such conditions is no greater upon the heart than ordinary activity. It has been estimated that the increased surgical risk is not over 5 per cent. It is surprising how well even serious risks tolerate operation under proper conditions. In an analysis of 494 operations in patients with heart disease, Butler, Feeney and Levine found the mortality to be 12.1 per cent. Of these deaths they estimated that 6.3 per cent might have occurred without the operation. In 35 patients with anginal heart failure the mortality was 7.7 per cent, while in 20 patients with coronary occlusion the mortality was 40 per cent, and with congestive failure a mortality of 17 per cent.

The preoperative preparation or treatment is important. If cardiac failure is present digitalis and other measures should be employed to attempt to restore compensation prior to the operation, rapidly or more slowly depending upon the time element involved. In the presence of auricular fibrillation or auricular flutter, digitalis is also indicated to control these arrhythmias. With these exceptions digitalis should be contraindicated preoperatively as doing no good and possibly doing harm by producing premature contractions, coupling, auricular fibrillation or heart block. It does not "tone up" cardiac muscle or prevent postoperative falls in blood pressure. In addition, it may interfere with the necessary emergency administration of large doses of digitalis or strophantin during or immediately after the operation. If possible it is preferable to restore a patient to cardiac compensation and then allow him up and about for a few days prior to the operation, rather than preceding the operation by a long period of bed rest. In patients with or suspected of having coronary artery sclerosis it has been suggested that the preoperative use of one of the xanthine vasodilators, like aminophyllin or calpurate, may be helpful and can do no harm. Every effort should be made to shield the patient from emotional stimuli, and the operation should be as short and as free from shock as possible. The usual recommended preoperative medication consists of one of the barbiturates, phenobarbital, nembutal or seconal 3 grains, the night before and morphine gain 1/4 or grain 1/6, and scopolamine grain 1/100 or grain 1/150 about one to one and a half hours before the operation. Many feel that scopolamine is to be preferred to atropine because it has more effect on the control of mucous secretion. It would seem desirable to allow the anesthetist, after consulting the surgeon and internist, to order such preoperative medication as indicated for the anesthetic to be administered. During the operation the position of the patient is often important. The Trendelenburg position should be avoided since it alters the position of the heart and decreases pulmonary ventilation. Asphyxia, shock and hemorrhage should be carefully avoided. When abnormal rhythms such as paroxysmal tachycardia, auricular fibrillation or flutter occur during or after the operation, they should be controlled by carotid sinus stimulation, quinidine or

digitalis as indicated. Postoperatively the patient should be watched carefully by a competent observer for shock or other complications and treated with carbon dioxide and oxygen and other stimulants such as metrazol, coramine, caffeine or strychnine.

TYPE OF ANESTHESIA

The question of the anesthetic now arises. Marvin has stated that "it is far more important to select the proper anesthetist than it is to select the proper anesthetic." Certainly the experience and skill of an anesthetist with a particular anesthetic determines to a large extent its choice. Likewise, there is still considerable controversy on this question and it is usually a matter of personal experience and choice. Nevertheless, there are some factors to be considered, and before discussing the various anesthetics let me mention some of the causes of surgical deaths. Death is due to complete cardiac anoxia. Once the heart stops beating it may be stimulated to contraction again but this will not continue until sufficient oxygen is supplied. Guedel states that circulatory accidents during anesthesia are broadly due to: (1) increased blood pressure; (2) decreased blood pressure, and (3) ventricular fibrillation. These three methods of production of complications will not be discussed in detail. Suffice it to say that any struggling or emotional excitement can produce marked rises in blood pressure which might result in acute or gradual cardiac dilatation with failure, rupture or an arteriosclerotic vessel or multiple cerebral petechial hemorrhages. A fall in blood pressure producing an insufficient supply of oxygen to the heart with the production of arrhythmia and death may be due either to hemorrhage or shock. The production of ventricular fibrillation may be produced by the anesthetic agent itself alone or by increasing the cardiac irritability to which is added the effect of humoral influences acting during the anesthesia. Adriani has pointed out that during an anesthesia in any individual there may arise arrhythmias, decreased cardiac output predisposing to cardiac failure, bradycardia, cerebral accident, hypertension, hypotension, pulmonary edema or ventricular fibrillation. Post-anesthetic sequelae are coronary occlusion, arrhythmias, bradycardia, shock, hypertension, and cerebral accidents. In a patient with cardiac disease, therefore, it behooves us to consider the effects of the possible complications and their effect on a damaged circulatory system, which certainly increases their probability and seriousness. We must also consider the frequency with which the various anesthetics produce such effects.

Chloroform can be considered and dismissed briefly. It is a direct cardiac muscle depressant and is dangerous even to a healthy heart. It is seldom employed. The blood pressure usually falls, ventricular fibrillation is possible at the onset of the anesthesia, myocardial irritability is increased and the cardiac output is decreased, just to mention a few effects.

Local anesthesia might be considered on first glance as ideal. It must be realized that the blood pressure often rises with small doses, and falls with larger doses. Novocaine or its derivatives are myocardial poisons and therefore not free of danger. Even more important is the fact that with a local anesthetic the element of emotional stimuli cannot be overcome and fear and excitement cannot adequately be removed in the cardiac patient. Occasionally, for short procedures in some patients it may be useful. Except for that, a properly chosen inhalation anesthetic offers no greater risk and has many recommendations. If there are contraindications to an inhalation anesthesia, such as pulmonary disease or diabetes, it might be useful.

Spinal anesthesia causes a systolic fall of the blood pressure with a diastolic pressure that is well maintained. This results in a decreased pulse pressure, decreased cardiac output and often an associated bradycardia with shock. Because of this fall in blood pressure it should be contraindicated in individuals with hypertension certainly, and in individuals, I believe, who show any evidence of cardiovascular dis-

ease. The objection of emotional stimuli is likewise not removed by spinal. The liberation of adrenalin into the circulation may prove harmful, especially in the presence of coronary sclerosis, producing angina pectoris or coronary thrombosis. The fear and excitement increase the metabolic rate with resulting stress on an already damaged heart, and cardiac arrhythmias may also result.

I believe cyclopropane to be definitely contraindicated in all cardiovascular disease. Its most serious objection is the tendency to produce cardiac arrhythmia, and ventricular fibrillation especially. This has been shown to occur frequently and I cannot feel that such arrhythmias that occur, such as displaced pacemaker, vagus escape, heart block, ventricular tachycardia, nodal and ventricular prematures, auricular flutter and auricular fibrillation, not to mention ventricular fibrillation, can do no harm to a damaged myocardium. If it is not agreed that it should be completely contraindicated in cardiovascular disease, certainly it should not be used in the presence of any of the arrhythmias or a history of an arrhythmia. If it is used epinephrine is contraindicated with it because of the possibility of precipitating ventricular fibrillation. Robbins has shown that the preoperative use of the barbiturates instead of morphine in dogs prevents the occurrence of ventricular fibrillation with cyclopropane, but this deserves more investigation in man before its verification. Perhaps this may remove this serious objection to the drug. The blood pressure may also either rise or fall. Postoperative shock also occurs frequently.

Ethylene does not affect the cardiac rate, nor is the blood pressure much affected. It does not produce arrhythmias, has no direct effect on the cardiac muscle. Ethylene and oxygen is apparently a very satisfactory anesthetic from a cardiac standpoint and some men prefer it. It does not give the degree of relaxation usually desired, however, and has a relative potency compared to ether and cyclopropane of 25 per cent.

Ether causes an acceleration of the cardiac rate. Cardiac arrhythmias are rare in light ether anesthesia and when they do occur they are from the auricle or the A-V node and seldom from the ventricle. Ventricular tachycardia and ventricular fibrillation rarely occurs. It can be combined with a high oxygen concentration.

SUMMARY

It appears to me that ether still remains the best anesthetic available for use in patients with heart disease. Either by the drop method or preferably by the closed method with accurate control of oxygen content it seems to be the anesthetic of choice. Perhaps the best anesthetic would be the combination of ethylene, ether and oxygen by the closed method, beginning with ethylene-oxygen for a more rapid induction and continuing the anesthetic with ether-oxygen. The post-anesthesia administration of carbon dioxide and oxygen might well avoid the objection of the long period of recovery. Ether is contraindicated, of course, in the presence of acidosis, pulmonary disease and increased intracranial pressure. Here the decision must be made as to the relative seriousness of the complications and the choice based on that decision.

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ANESTHESIA IN OBSTETRICS

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Within recent years there has been a tendency toward a more conservative attitude in pain relief during labor, and women and obstetricians are beginning to realize the importance of relying upon the anesthetist's judgment in selecting the type of anesthesia best suited to their particular case.

It is beyond the scope of this paper to discuss all the agents used for analgesia during the first stage of labor, and will be limited to those used for pain relief of the second and third stages.

The patient in labor is different from others in two outstanding ways. First, the anesthetic must be given when she is ready to deliver. There is little time for deliberation or preoperative preparation. Seldom does she have the advantage of a hypodermic of atropine or scopolamine to prohibit the flow of saliva. More often than not she has a full stomach, because just before pains began she had a large meal. It matters not that the meal was taken several hours prior to delivery, as once labor has started, digestive processes cease and food seldom leaves the stomach.

Secondly, there are two individuals for whose safety we are responsible and both must constantly receive an adequate supply of oxygen. This oxygen supply is of most important consideration when administering an obstetrical anesthetic. Some degrees of anoxemia which the mother can tolerate without deleterious effect are fatal to the baby, because the blood of the baby is less saturated with oxygen than that of the mother.

There should be a suction apparatus at hand so that mucous or vomitus can be removed from the pharynx to prevent aspiration of foreign material into the trachea and obstruction of the larynx which results in varying degrees of anoxemia.

Anesthetic agents which require the reduction of oxygen to produce the desired relaxation should not be used. Mechanical airways should be available which may be used to prevent obstruction to respiration due to falling back of the tongue and laryngeal spasm. Regardless of what mixture the gas machine is regulated to deliver, adequate oxygenation is not possible if the air passages are obstructed in any manner.

A most noticeable and valuable sign of anoxia is cyanosis, so the patient's color should be watched closely at all times. However, there is one grave pitfall that should be remembered. The anemic patient will present little or no cyanosis because a relatively high concentration of hemoglobin is necessary for this sign to become manifest.

The agent selected for use in the second stage of labor depends somewhat on the analgesic drugs which the patient has received. If large doses of the barbiturates and morphine have been given for pain relief, it is not wise to administer an agent which will further depress respiration.

The ideal anesthetic agent should have the following properties: (1) Pleasing the patient; (2) induction and recovery rapid; (3) easily controllable and potent enough to produce muscular relaxation; (4) safe for mother and child and be effective in the presence of high oxygen concentration; (5) relieve restlessness and not retard labor; (6) have no immediate or late deleterious effects on the mother or baby.

No one agent has all these properties; however, we have at our command several drugs, each of which possesses one or more of the advantages enumerated above.

Young, healthy, so-called normal patients, in labor, who present a good risk, will come through with their lives regardless of the anesthetic used. For patients who present a substandard risk the ability of the anesthetist to select and use the proper agent may mean the difference between life and death of the mother and baby. For these patients the agent or combination of agents which will achieve the proper depth of anesthesia and be least toxic to vital organs should be selected.

The anesthetic agents used in labor may be divided into general and peripheral.

GENERAL AGENTS
A. LIQUIDS

(1) *Chloroform* was first used by Simpson in 1847. It has a sweetish, pleasant odor and is not objectionable to the patient. The potency is great and induction is rapid. Any degree of relaxation may be obtained. It is non-inflammable and may be given by the simple drop method. In spite of these advantages, it should not be used because of the small margin of safety, and frequent immediate toxic effect on the heart muscle, and late toxic effect on the liver, occasionally resulting in fatality. If used at all it should be limited to intermittent administration during pains. The mask should be kept away from the face to allow for free mixture with air. It is not safe for long periods of time or deep anesthesia.

(2) *Vinyl ether* (vinethene) is four times more potent than ethyl ether and one and one-half times more potent than chloroform. In light anesthesia and analgesia it does not depress the muscle tone of the uterus or intestines. Induction and recovery are rapid. The odor is that of garlic; and the vapor is irritating to the respiratory tract, causing a free flow of thick mucous and saliva.

Its margin of safety is small and even planes of anesthesia are difficult to maintain because of its extreme potency and short induction period.

Bourne advocates the use of a mixture of 25 per cent vinyl ether and 75 per cent ethyl ether to take place of the much more slowly acting ethyl ether and the very much more toxic chloroform, because of ease of administration, rapidity of action, satisfactory maintenance of any degree of narcosis and early recovery.

It has not been possible for me to get such excellent results with vinyl ether alone or in combination with ethyl ether, and I do not recommend its use if other more desirable agents are available.

(3) *Ethyl ether* is one of the most commonly used agents. Its properties are well known and need not be enumerated.

Labor pains and tone of the uterine muscle are depressed by ether in proportion to the depth of anesthesia. Because of this it is the ideal agent to be used for podalic version. The combination of enough ether, adrenalin intramuscularly, and sufficient time will relax all but the most severely contracted uteri and allow for a relatively easy podalic version. This point cannot be stressed too greatly, as I have too often seen the baby killed by means of version attempted in an unrelaxed uterus, because an anesthetic agent of insufficient potency was used or the obstetrician failed to wait long enough to allow the ether to take effect. As soon as version has been completed, ether should be stopped and a less toxic agent used to continue anesthesia.

Ether may be used intermittently for analgesia during pains, but is not as satisfactory as the gases because of its slower action and depressing effect on uterine tone. It may be added to the gas mixture if sufficient relaxation is not obtained.

Ether has very little depressing effect on the baby and the oxygen saturation of his blood is not appreciably decreased.

It is slightly toxic to parenchymatous organs and irritating to the respiratory mucous membranes. The contraindications to the use of ether are: (a) toxemias of renal or hepatic origin; (b) diseases of the lungs and upper respiratory passages; (c) diabetes, because it increases the blood sugar concentration and decreases the alkaline reserve, and (d) dehydration.

(4) The *barbiturates* are put under this classification because they are given in liquid form and produce general anesthesia.

The long acting barbiturates such as sodium amytal and nembutal are used to stop the convulsions of eclampsia. They are given intravenously in sufficient dosage to produce sleep for several hours. The short acting ones, evipal and sodium pentothal, are useful for extremely short procedures, such as examination or rupture of the membranes, and may be given as premedication prior to operative delivery. They should not be used as a total anesthetic because in the larger doses which are required respiration is depressed to such a degree that anoxemia frequently results.

GASES

Gas anesthesia in general proves more satisfactory than other methods in that it is more flexible and offers a more accurate control of the oxygen content of the maternal fetal blood.

(1) *Nitrous oxide*, an almost odorless non-inflammable gas, produces first plane anesthesia in mixtures of 85 to 90 per cent with oxygen. It is a widely used agent in obstetrics because of its rapid induction and recovery time, and extremely short period of nausea. It does not retard contractions nor decrease uterine tone. Nitrous oxide is eliminated unchanged through the lungs and per se has no deleterious effects on any tissues of the body.

It does not produce relaxation in mixtures containing adequate oxygen and at times even first plane anesthesia is difficult to obtain. This causes the anesthetist to decrease the oxygen percentage to dangerously low levels.

Courville has reported several cases of lesions of the brain following the usual administration of nitrous oxide. He blames anoxia, which so frequently occurs during its administration.

Since the fetus cannot tolerate anoxemia as well as the mother, nitrous oxide should only be used intermittently for pain relief in spontaneous deliveries and never in mixtures of less than 15 per cent oxygen. If operative delivery or relaxation is necessary it is best to change to a more potent agent.

(2) *Ethylene*, a non-irritating colorless gas with an unpleasant odor and taste, is inflammable. It is not altered or combined in the body and in major part is eliminated through the lungs within two minutes. It is non-toxic to vital organs and has very little effect on blood chemistry.

Analgesia is obtained with mixtures of 20 to 35 per cent, unconsciousness with 60 per cent, and anesthesia with 80 to 90 per cent. There is usually a mild degree of anoxia present, but first plane anesthesia may be maintained with safety for the mother and fetus. Administration in 75 per cent concentration during pains results in very satisfactory analgesia. The tone and contractions of the uterus are not decreased and the patient can bear down more effectively because of the relief from pain. When the head comes over the perineum or if forceps are applied, adequate anesthesia can be obtained by increasing the concentration to 80 or 85 per cent. This permits an adequate amount of oxygen for the mother and baby.

If manipulations are contemplated which require uterine or muscular relaxation, ether should be added. It is not safe and rarely possible to get relaxation with the use of ethylene alone.

Ethylene approaches the ideal agent for obstetrical anesthesia and may be used with safety for the patient with toxemia of renal or hepatic origin. It may be used for the diabetic mother, as it increases the blood sugar very little and has a minimum effect on the alkaline reserve.

Thus, unless muscular relaxation is necessary, ethylene is the agent of choice for patients in labor.

(3) *Cyclopropane* is a highly inflammable and explosive gas with a slightly sweet, pungent odor, and is non-irritating to mucous membranes.

It is eliminated unchanged through the lungs, is non-toxic to vital organs with possibly one exception. In high concentrations it may increase the irritability of the heart muscle and it is possible that ventricular fibrillation may result from the simultaneous use of adrenalin. Fortunately, however, I have never seen this occur.

It is anesthetic in concentrations of 10 per cent and upwards. It is a respiratory depressant causing respiratory paralysis in concentrations of 40 per cent and above. With artificial respiration concentrations as high as 75 per cent can usually be tolerated. Good muscular relaxation may be produced with mixtures as low as 20 per cent but at times much greater concentrations are necessary.

Because of its high potency an abundance of oxygen is always present in the anesthetic mixture, resulting in a very high saturation of the maternal and fetal blood.

Due to the extremely high cost of cyclopropane it must be administered in a closed system and is not easily adaptable for intermittent use. It is impossible to maintain a constant mixture in the breathing bag, because each time the patient breathes into it the gases are diluted with air.

Cyclopropane is an excellent anesthetic for all types of operative delivery except podalic version. It is not applicable for version because uterine relaxation is obtained only in the presence of extremely high concentrations, usually past respiratory arrest and frequently an excessive flow of thick, tenacious mucous occurs as the result of central stimulation. Furthermore, adrenalin is frequently used to aid uterine relaxation, and this drug should not be given when cyclopropane is being administered.

It is the inhalation agent of choice for cesarean section. Skeletal muscular relaxation is good with maintenance of uterine and intestinal tone. Recovery is rapid and because of the high oxygen content of the blood the baby seldom needs resuscitation. The postoperative period of nausea and vomiting is usually very short.

Morgan reported 100 cases of cesarean section under cyclopropane and compared them with 100 similar cases under other types of anesthesia, principally ethylene and ether. He found a marked improvement in the postoperative course of the cyclopropane cases, particularly in regard to the factor of nausea, vomiting and abdominal distention. The cyclopropane cases required an average of three days less hospitalization. He presumed that less uterine hemorrhage and less disturbance to bowel function were the principal reasons for smoother convalescence following cyclopropane anesthesia.

Because cyclopropane is non-toxic and non-irritating, it may be used with safety for patients with toxemia, pulmonary and mild cardiac disease.

II. PERIPHERAL ANESTHESIA

A. Local infiltration is reserved for operative delivery of the poor risk patients. Those with severe toxemia, shock or heart failure are more safely delivered with local infiltration of the tissues which are to be cut. It may be necessary to supplement this anesthesia with 50 per cent nitrous oxide or ethylene to allay discomfort, apprehension and fear.

B. Caudal block comprises insertion of a needle into the caudal canal through which is deposited 20 to 100 c. c. of the anesthetic solution. This results in an epidural anesthetic, the height of which depends on the amount of solution injected.

Some obstetricians use this anesthetic routinely and claim excellent results. I feel that it has definite advantages in selected cases but is not ideal for all patients. The advantages are that there is no effect on the baby; usually no effect on the tone or contractions of the uterus; no systemic effects on the mother; excellent relaxation of the vagina and perineal muscles; very little drop in blood pressure; and the patient is awake and able to aid delivery by contracting her abdominal muscles.

The disadvantages are that it is effective in only 85 per cent of cases; induction of anesthesia is slow, 15 to 30 minutes; it is not always possible to locate the caudal hiatus; the duration of anesthesia is limited to 40 to 60 minutes; and systemic reactions are possible, due to hypersensitivity or injection of the drug into the circulation.

This type of anesthesia may be used to advantage for patients with severe upper respiratory infections, toxemia, pulmonary or cardiac diseases.

C. Spinal anesthesia is more free from toxicity to vital organs, most prompt, least time consuming, simplest to apply and the most efficient of all the peripheral anesthetics. There is excellent relaxation, good uterine tone, diminished blood loss, decreased nausea and vomiting and no need of resuscitation of the baby.

The height of anesthesia may be kept relatively low and the dosage required is small. Thus, there is little disturbance to circulation.

The objectionable features are that many people fear this type of anesthetic; the duration is definitely limited and the parturient patient not easily manipulated.

It has proved very satisfactory for cesarean section and other types of operative delivery when there has been some contraindictation to an inhalation anesthetic.

The contraindications to spinal anesthesia are extreme arterial tensions; pathology of the spinal cord; cutaneous infection at the proposed site of puncture; septicemia; shock and anemia.

The patient who presents a very poor risk is no fit subject for spinal anesthesia, and in the past it had become unpopular because it was frequently reserved for just such cases. At present, the contraindications are better understood and it has been proved to be serviceable and safe.

SUMMARY

For normal, healthy obstetrical patients any of the commonly used anesthetic agents produce fairly satisfactory results, if administered properly.

If all the modern anesthetic agents are available it is advisable to use ethylene for the general run of labor cases; cyclopropane or spinal for operative delivery when relaxation is desired; and ether for internal podalic version.

The so called 'poor risk' cases present a more difficult problem. The procedure which is contemplated must be considered, and the agent selected which will give the necessary depth of anesthesia with least toxicity and having the least deleterious effect on the mother and fetus.

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DISCUSSION

Dr. James D. Rives (New Orleans): There is one point which has been passed without comment by each of the essayists. Some of us, including myself, have strong convictions as to what is the anesthetic of choice in the presence of respiratory tract infections. Most people accept without question the common belief that inhalation anesthesia, especially with ether, is contraindicated under such circumstances. As a matter of fact, there is no statistical evidence to show that ether is more dangerous than other inhalation anesthetics nor that inhalation anesthetics are more dangerous than spinal anesthetics. In fact, there is some statistical evidence that spinal anesthesia is the most dangerous of all. In the January 1942 issue of the Archives of Surgery, there are two articles by John Lyford of Baltimore that are quite illuminating. The first article reports that in 631 patients without respiratory tract infections who were subjected to abdominal operations, the incidence of postoperative complications of the respiratory tract was as follows: 242 patients with ether anesthesia, 5.8 per cent; 163 with cyclopropane anesthesia, 4.9 per cent; 226 with spinal anesthesia, 7.5 per cent. The difference in incidence of respiratory tract complications was not large enough to be significant but such difference as there was would indicate that spinal anesthesia is the most dangerous in this respect. The second article reports that, in 120 patients with common low grade infections of the upper respiratory tract who were subjected to abdominal operations, the incidence of postoperative complications of the respiratory tract was as follows: 37 with ether anesthesia, 13.5 per cent; 40 with cyclopropane, 17.5 per cent; and 43 with spinal, 39.5 per cent.

It is interesting to note that in a recent symposium on spinal anesthesia Churchill stated that he uses ether as the anesthetic of choice in thoracic operations, including those on patients with pulmonary tuberculosis.

I would not have you believe that I think the presence of respiratory tract infections should not influence our choice of anesthetics. As a matter of fact, I suspect that ether is undesirable under these circumstances on account of its irritant effect on the mucous membranes of the respiratory

tract. The point I wish to make is that there is not at the present time any statistical evidence to support this belief and that until such evidence is available the matter should not be considered closed.

Dr. J. A. Danna (New Orleans): When I first came into the medical field we were using chloroform only as a general anesthetic. In 1905 I thought I would find out why it was that we felt that way about chloroform in New Orleans and generally throughout the South, while in the North they used ether almost exclusively. I visited clinics in Baltimore, Philadelphia, New York, Boston, Chicago and the Mayo Clinic. I came back and showed the interns at Charity Hospital how to give ether as done in the Mayo Clinic. From then on ether was the anesthetic generally used. My interest in anesthesia goes back that far.

Not very long after we began to use ether I had occasion to remove a large sequestrum consisting of almost all of the lower jaw, from angle to angle, in a patient, and after I washed my hands and the patient was still in the operating room, I noticed a lump under the jaw which was not draining and I felt I should stick a knife in it. The light anesthetic given had practically worn away. I knew that with chloroform, unless the patient was thoroughly under, one could not make an incision. I had the nurses hold him down and made a crucial incision under the chin. He did not budge in spite of the fact that he was nearly awake.

Quite a number of years after that, I had occasion to do an exploratory operation on a brain case, osteo-plastic flap and so forth—which took over two hours. I was afraid of the patient getting too much anesthesia so I told the anesthetist to get the patient thoroughly under but as soon as under for a few minutes, stop the anesthetic and not give any more without saying something about it. I worked for over two hours and when finished, to my amazement found the patient had received no anesthetic after the first few minutes.

Remembering then the case of the man whose chin I had incised I realized there was something about ether—that the pain sense is diminished in a patient given ether for a long time after he is practically awake. After trying it out a number of times, I found that it worked very well in prolonged operations, the patient being deeply anesthetized, the anesthetic stopped after 45 minutes or one hour, and the operation continued for an hour or longer thereafter without difficulty.

I would like to show a slide.

	Prep.	Op. +An.	Op. −An.	
1.	21 min.	14 min.	58 min.	35/ 93
2.	15 min.	60 min.	60 min.	75/125
3.	15 min.	60 min.	95 min.	75/170

These are figures for three cases. The first column shows time of induction; second column shows the time during which the patient was operated on and during which the anesthetic was administered; the third column shows the time operated on without any anesthesia at all, after anesthetic was stopped; the last shows actual anesthesia time compared to total induction and operative time. The first case had 35 minutes of anesthetic against 93; the next had 75 against 125; and the next 75 against 170. The first case was a radical breast case.

The second case was a case of large ventral incisional hernia. After I got the peritoneum closed and the anesthetic had been stopped for about ten minutes the patient got to struggling and I thought the anesthetic would have to be resumed. The anesthetist, however, noticed that she had an air way in the patient's throat. The air way was removed and the operation was finished without difficulty.

The third case was a difficult prolonged hysterectomy for fibroid. This patient had been given fifteen minutes induction, sixty minutes anesthesia and ninety-five minutes of further operation without any anesthetic. As I inserted my last suture in the skin the patient said "That hurts." That shows to what extent the patient had recovered.

The point is this. There is something about ether that makes it different from any other anesthetic. You cannot use any other anesthetic that I know of and work an hour or an hour and a half after stopping the anesthetic, like with ether.

Another point about this last patient is when I left the operating room and went down to see her on the way out, she was wide awake, and the patients are not immediately wide awake if given ether continuously throughout operation; not awake until two or three hours later.

Dr. E. L. King (New Orleans): Obstetrical anesthesia has been of great interest to me for a long time. I have found nitrous oxide is fairly satisfactory, as brought out, but it has its disadvantages in not being able to be given except with a considerable per cent of oxygen and without preliminary analgesia it does not give sufficient anesthesia or analgesia. In my own experience we did not get as much relief on the part of the patient with nitrous oxide as in the past few years with ethylene. That, to me, is the most satisfactory anesthetic in general or obstetrical patients. The high degree of oxygen permitted in ethylene is beneficial to the mother and to the baby and we must not forget that the baby is even more important than the mother as to high oxygen content. I want to emphasize a point stressed already—that for internal podalic version you must have full relaxation and ether is about the only thing that will give relaxation safely and properly. As we all know, years ago chloroform as we used it was particularly valuable for version and I remember Dr. Lewis telling us many years ago that in his days of active obstetrical practice when he was called to do a version he always insisted that

the patient be sound asleep and then sat twiddling his thumbs for three minutes more after she was anesthetized. Version takes ten or fifteen minutes. Chloroform for that time does not seem to have any deleterious effects at the time or later. Most of us prefer ether, feeling it is safer for the patient. Ethylene, as brought out, will not give relaxation and neither will oxide-oxygen or spinal. Give ether and when the patient is well asleep, as Dr. Lewis said, wait five or ten minutes after relaxation is supposed to be complete, before doing the version. Once in a while we find in contemplated version, a contraction ring. In contraction ring use ether and adrenalin to relax the ring. I had such an experience a week ago. I used plenty of ether and adrenalin and got sufficient relaxation to deliver the baby safely.

For forceps delivery some of us have used sacral block which has slight danger and we have had difficulty with that. Most of us do not like spinal anesthesia in obstetrics. I prefer a general anesthetic, given by an anesthetist. A good many do use spinal here and elsewhere. I would rather have my cases handled by an expert anesthetist, giving a general anesthetic. If spinal is used an expert should be present.

Anesthesia is a field of its own; it is a medical field, requiring expert medical men, well trained in medicine and well trained in anesthesia. It is not a mechanic's job. It is not a question of somebody knowing something of anesthesia, knowing how to hold the cone and manipulate the valves; the main part is he shouid be a good doctor and a good anesthetist.

Dr. Ansel Caine (New Orleans): I wish to say a few words regarding complications following spinals in respiratory trouble and following other anesthesia. If you give a spinal anesthetic high enough to produce good anesthesia for laparotomy, necessarily you catch the diaphragm to some extent and if it lasts over any length of time the lungs are not thoroughly expanded during anesthesia. Just the opposite is true with ether. Expiration is deep with ether. With spinal anesthesia, respiration is fairly shallow and the terminal aveoli is not thoroughly ventilated during the job unless the anesthetist puts the mask on the patient and presses on the bag and inflates the lung. Occasionally throughout the operation when giving oxygen and nothing to put to sleep, hold the mask over the face and inflate the lung; however the oxygen will be absorbed quite rapidly. At the end of operation it is quite the thing to do, to use the same procedure, using air instead of oxygen which is absorbed slower than oxygen. Oxygen requires about 15 minutes to be absorbed while nitrogen requires something like 18 hours to be absorbed. Also when the patient gets back to bed this same procedure should be practiced occasionally until the patient is completely out from under the anesthesia or analgesia or block, because if it is possible to continue operation and complete operation without pain the same condition is maintained after the patient gets back to bed. I think that accounts for the high percentage of pulmonary complications because you and I know that spinal anesthesia does not irritate the lung and there is bound to be reason for these complications following and I think the reason is lack of ventilation. Practically after all operations deep breathing should be encouraged by the attending nurse who is instructed to see that the patient breathes deeply and fully ventilates. That is a lot of the trouble I feel certain.

Now I want to say a word or two about heart trouble. I believe that spinal analgesia, in the presence of coronary, is rather bad because if you have a narrowed coronary vessel and the patient is getting along pretty well with 180 or 170 blood pressure and you bring the blood pressure down to say 100 or 110, that is way below what the patient is getting along with. I recall a case in which I was told that such a thing took place and that was the opinion of the anesthetist.

In the presence of myocardial disease spasm is disastrous. I know of a case that one of us had in which it was thought that was the trouble; the death was due to spasm and strain on an extremely bad heart. It was a case coming to cardiolysis.

There was another case I had of a man in his late seventies—there was a good spasm while I was attempting to insert the tube to prevent a spasm. I anticipated this and while getting ready to insert the tube got the spasm and when relieved this man went out. He might have died anyway. He had aneurysm, had a big clot, and when it was cut it looked like fibroid. However, after all is said on the subject, he died of an excessive strain on his heart due to spasm.

Dr. Edgar Hull (New Orleans): I should like to make a few brief remarks and ask one question. I would like to add to cardiac conditions mentioned by Dr. Wirth which make poor risks for anesthesia and surgery: first, patients with big hearts no matter what the cause of cardiac enlargement is; and second, the congenital cardiac with cyanosis.

I would also like to mention the fact that most men of experience think cyclopropane is contraindicated in operations on toxic thyroids.

I understand that some of the anesthetists in the city are using a mixture of ethylene and cyclopropane in routine anesthesias because they believe the incidence of arrhythmias thereby is diminished. I would like to have Dr. Adriani's opinion about the use of such a mixture.

Dr. C. W. Mattingly (New Orleans: About spinal analgesia in upper respiratory infection, I think it is a common custom for most surgeons to use spinal with acute upper respiratory infection before operations, especially emergencies. I do not ever think of using spinal without use of carbon dioxide oxygen inhalations for several days

afterward with subdiaphragmatic surgery and expect some paralysis of the respiratory muscles with spinal and general. I am satisfied we have less respiratory infections postoperatively with spinal than with inhalation anesthetics.

Dr. John Adriani (New Orleans): Dr. Rives asked which is the best type of anesthesia for patients who have disease of the respiratory tract. Perhaps I did not emphasize that the gases are best if inhalation anesthesia is used. These are less irritating and produce less secretions than the ethers and other volatile liquids. There is no concrete evidence that ether predisposes to or enhances existing respiratory infection. The incidence of postoperative pulmonary complications is dependent upon many factors such as age, complicating systemic diseases, technic of administration of the anesthetic, duration and depth of anesthesia, type of operation, operating time and skill of the anesthetist. Ether may be preferred to cyclopropane in thoracic surgery because of the cardiac effects of the latter. The fact that ether allows more oxygenation than cyclopropane, since the concentration required for anesthesia is so low, is not a good reason for using ether.

Cyclopropane can be given with a concentration as high as 70 per cent oxygen. The difference between this and that allowed by ether is about 20 per cent and of no practical clinical significance.

The mixing of ethylene and cyclopropane does not abolish the cardiac effects of cyclopropane. This practice is used by some for thyroidectomy supposedly to minimize the amount of cyclopropane. I have seen one death thought to be a cardiac death with cyclopropane in a patient with thyrotoxicosis. I do not feel that mixing the two gases minimizes any attendant danger of this drug.

Dr. Willard R. Wirth (New Orleans): I have nothing further to add to the discussion except that I accept Dr. Hull's addition as worth while and agree with him entirely that a very large heart or the presence of cyanosis in congenital heart disease, furnish serious risks in surgery.

Dr. Merrill C. Beck (New Orleans): I think it is impossible to answer Dr. Rives' question in any dogmatic terms as to which is the best anesthetic under certain conditions. All we can do is take large groups of statistics and if done on a large number of people, figure which is best and the percentage of postoperative complications. It is the consensus that ether in upper respiratory infection is more irritating and should not be used and that we should instead use spinal anesthesia or gases. I think the increased incidence of postoperative complications which occur in the patients with upper respiratory infections who had spinal anesthesia, are due to the phenomenon Dr. Caine spoke about; insufficient ventilation of the aveoli, causing stasis. As you know, any stagnation or stasis increases the susceptibility of that area to infection. We do not know any group of cases where these patients hyperventilated, probably oxygen, carbon dioxide or air.

Another consideration is to take the individual anesthetist's ability. Just as some surgeons can be dogmatic about one type of incision instead of another; in performing an appendectomy some use McBurney's incision and others find this difficult and use right rectus incision, with good results. If an anesthetist finds he gives one anesthetic better he should use the agent with which he is most familiar.

Dr. Danna spoke of the phenomenon of ether. I do not think it is difficult to explain that. Ether is different from other agents in one outstanding way. It has very slow action. During induction there is a period of analgesia and the patient has his senses, can talk to you and respond to what you say and still has no pain sensation. When ether is given from 30 to 60 minutes a large amount of this is absorbed in the fluids of the body and into the fats. Just because the ether mask is taken away does not mean the patient is not having an anesthetic. With induction the anesthetic is taken into the lungs and blood stream and gradually infiltrated into the fluids and the fats. The depth of anesthesia depends on the concentration in the blood stream, not in the mask on the face. When the mask is taken away the ether is lost through the lungs out of the blood. At the same time it is taken up from the fluids and the fats so that it is possible for a period of analgesia to last an extremely long time with ether. It is not possible for this to happen with other agents used because they are eliminated so fast.

There was a lot of discussion and talk on what spinal did and how bad it was. Spinal, in obstetrics, I do not think is bad. It works well at times if given quite low. These phenomena of markedly depressed circulation and other defects, occur with relatively high spinals. It should be kept low. The degree of circulatory and respiratory trouble is in relation to height.

Most of us like cyclopropane in toxic thyroid cases because, as you know, the metabolism is high; there is a large amount of oxygen used and it is not possible to maintain good anesthesia with other gases because you can not get enough oxygen.

I was disappointed in Dr. Adriani's difficulty with fibrillation. Our group has given cyclopropane as a choice in most cases and to my recollection we have seen none die from ventricular fibrillation. In a patient with heart disease, as stated, the main thing is to keep a large supply of oxygen. We think we can do this with cyclopropane as well, if not better than with other agents.

THE MODERN MANAGEMENT OF FOOD ALLERGY*

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Centuries ago Hippocrates undoubtedly recognized individual food disagreements. Food allergy, however, first became a part of medical literature in 1914 with the report of Laroche, Richet, and Saint Girons.[1] During the past 15 years methods for the study of food allergy have been evolved. We must now realize how many deeply rooted ideas must be altered in order to accept and utilize this concept. Functional or nervous dyspepsia should no longer be diagnosed without first excluding food allergy. Patients who give a history of specific food disagreements are nearly always correct in this belief. Alvarez[2] does not exaggerate when he states that the "gastro-enterologist who neglects this new field of food allergy is daily sending away, unhelped, patients whom he might be relieving in a spectacular way."

Food allergy is not a rare condition and can be found in many patients with gastrointestinal complaints. Although as you know, statistics may be found to prove any statement, there are three reports which reveal unbelievably high incidence of this condition. Hinshaw and Alvarez[3] found that of 500 patients with dyspepsia almost all had to avoid one or more foods; 29 per cent were made severely ill by eating foods. Vaughan[4] studied 500 villagers in Virginia and found 60 per cent to be food sensitive. Rowe[5] found 31 per cent to be allergic to foods among 400 university students and nurses. These figures of course include "minor allergy" in which comparatively little trouble is caused by one or two articles of diet as well as "major allergy" in which many severe symptoms result from food sensitivity. Any portion of the gastrointestinal tract may be affected by the allergic reaction. There are no characteristic symptoms, although dyspepsia and the syndrome of the irritable colon are the most frequent.

The recognition of the foods causing the trouble is not always a difficult matter and may not require time consuming procedures. Cardon[6] points out that milk allergy is very frequent and may be recognized at the bedside. Patients with minor allergic symptoms are also no problem. Each case of food allergy must be individualized, and may require time, perseverance, and all the methods to be outlined before relief is finally obtained.

HISTORY

A thorough history is essential for diagnosis. Careful note should be made of food disagreements, dislikes, and aversions. At times patients are found to be sensitive to foods they dislike. This information is especially important, however, in planning a diet which the patient will take and enjoy. A list of foods submitted to patients will often serve to refresh their memories. This part of the history will frequently differentiate the patient with allergy from one with gallbladder or nervous dyspepsia. The allergic patient gives a history of partial milk allergy, or may have found that raw foods disagree while cooked foods may be taken with impunity. The foods they report as causing trouble are the ones most frequently responsible for allergy. Gastrointestinal allergy is often present without any other allergic manifestation and in the absence of a positive family history.

SKIN TESTING

Skin testing to recognize the offending foods is considered to have only a 50 per cent accuracy. Rowe[7] feels that the tests are so misleading as to render them superfluous. In my experience skin tests with the best of the presently available food extracts justifies their use, even though the reactions obtained are not as reliable as in the case of the inhalant antigens. Scratch testing in these cases is usually negative. Positive food tests should be sought for by the more sensitive intradermal method of testing. Positive reacting foods are avoided whenever possible in selecting the initial diet. In this way the chances of producing

*Read before the sixty-third annual meeting of the Louisiana State Medical Society, New Orleans, April 28, 1942.

relief with the initial diet are greater. The skin tests also serve to demonstrate to the patients their allergy in a graphic way and what may happen in their gastrointestinal tracts. This aids in securing the satisfactory cooperation of the patient.

The leukopenic index was proposed by Vaughan[8] several years ago to assist in the recognition of food allergy. The test is performed by making two leukocyte counts in the fasting state of 30 minute intervals. One hour after the completion of a breakfast of the food to be tested, a third count is made, and a final fourth count is made 30 minutes later. If either of the two counts falls 1000 or more below the fasting mean the index is positive and the patient allergic to the food tested. Vaughan found the leukopenic index to be more reliable than skin tests. This test, although it is an interesting phenomenon, is of little practical aid. The blood counts are time consuming and must be performed with the utmost care. Only one food a day may be tested. This procedure, furthermore, does not do away with the necessity for direct trial with the offending foods. The validity of the work upon which the test is based has not been uniformly accepted.

Food diaries may be kept by the patient to record all foods taken and their possible relationship to symptoms. This type of record is of no value in the patient whose meals are prepared away from home. It is impossible to control such a diet and exclude common offending foods. Food diaries can only be used when the symptoms are intermittent and do not occur daily. The analysis of such a report is not an easy matter, and requires experience. Their interpretation should take into account the inaccuracy of patients' records. Furthermore, symptoms which occur may be related to events not associated with the food intake. The analysis of these diaries is always time consuming and often unproductive. I have, therefore, used the food diary in conjunction with the elimination diet as another check on the cooperation of the patient during the period of diet trial.

DIET TRIAL

Numerous methods of diet trial have been evolved. With simple problems complicated methods are unnecessary. Minor adjustments in the diet frequently suffice. Where the degree of sensitivity is an unknown factor some type of diet trial becomes necessary. All methods begin with a greatly restricted diet until all symptoms are relieved and then one food is added at a time.

Very radical restriction is prescribed by Andresen.[9] He employs two test diets; the first consisting of five common foods — milk, wheat, egg, potato, and orange. This diet is used when symptoms occur occasionally. The second diet consists of rice, gelatin, rye, peas, and raspberries. When symptoms are relieved a new food is added daily. This system possesses the fault of using an extremely fixed, limited initial diet. The second diet is to be used when symptoms occur frequently, and certainly would not recommend itself to the gourmet. Furthermore, reaction to a food may take place several days after it is eaten, so the daily addition of a new food is unsafe.

When symptoms occur frequently Alvarez[10] employs a somewhat similar fixed elimination diet (table 1). If the patient is not relieved, successive diet changes are made. If the symptoms persist after these four diets are tried, the patient is considered to be probably not allergic to foods.

Rowe deserves much of the credit for the advances in this field. The elimination diet as developed by him has proved useful because each diet is balanced, satisfying, and possesses sufficient variety. One may select as the initial diet the best suited for the patient, taking into account the history as well as the positive scratch tests. Ten diets are used by Rowe[7] at the present time (table 2). These are essentially practical and furnish many suggestions for menus. The principal objection to these diets is the impossibility of obtaining locally such unusual foods as soy bean oil, sesame oil, and flours prepared from rice, potato, lima bean, and soy bean. Many patients object to baking special breads unless they are

found to be wheat sensitive and must adopt rice or other cereal substitutes as a permanent measure.

Dale and Thornburg[11] have proposed as modifications of the Rowe diets two diets which contain 21 and 23 hypo-allergic articles. Their objection to the Rowe diets is their low calcium and sub-optimal vitamin content. This objection, however, can easily be met by trying milk early in the process of food addition.

The technic of diet trial which I employ most frequently is another modification of these several systems. An elimination diet is selected and made up for each patient individually. An attempt is made to start with about 20 items selected from a list of hypo-allergic foods (table 3). The foods chosen represent those to which the patient gives no history of disagreement, dislike, or aversion, and to which no strongly positive skin tests have been obtained. In some instances the diet is selected without performing skin tests. As far as possible Vaughan's botanical classification[8] of closely related foods is followed where cross reactions have been shown to occur. Thus, if there is a history of intolerance to cabbage, the entire cabbage family — brussel sprouts, cauliflower, and broccoli are avoided.

This individualization also enables us to use judgment in ordering the baking of special breads and foods difficult to obtain during this test period. Patients are instructed to eat liberally of the test foods and to keep a food diary recording all foods taken. If relief does not follow this diet the information obtained may point to unsuspected food sensitivities. If necessary, the initial elimination diet is adjusted for another trial period. The diet which brings relief is always followed at least seven to 14 days to obtain maximal relief before other foods are added. Since the initial diets are not fully balanced and are especially low in calcium, I add some form of milk first instead of trying this last as Rowe recommends. If necessary, dicalcium phosphate and one of the polyvitamin preparations available are utilized. I have never had any marked weight loss or evidence of avitaminosis on this plan. After relief is obtained and results assured a new hypo-allergic food is added every four days. After the initial period the keeping of a formal food diary is omitted. A careful record is kept of dates of food disagreements and resultant symptoms. After several months the foods which the patient suspected of causing trouble are tried.

The problem of evaluating the role of allergy in gastrointestinal syndromes is complicated by many factors. The degree of allergy is often not constant or continuous but may tend to recur in cycles. This gives rise to occasional or periodic trouble and patients will state that certain foods disagree at times. This type of cyclic food allergy probably exists in chronic ulcerative colitis. The allergic reaction is also conditioned by such non-specific excitants as the state of the psyche, menstruation, infection, or seasonal influences. Duke[12] has also noted the non-specific irritating effects of rough foods in patients with chronic food allergy. The existence of psychoneurosis will very often serve to act as the trigger mechanism whereby allergic reactions are initiated. This can be demonstrated by watching the long range behavior of highly sensitive individuals in relation to their environment and biography.

TREATMENT

In treating food allergy the extreme variations in the degree of food sensivity should be appreciated. Thus, rare cases are so milk sensitive as not to be able to take butter. Usually, however, patients are sensitive to food in a less dramatic way. Foods may have to be taken repeatedly before symptoms occur. The cooking of foods affects their allergenicity. This fundamental fact many patients have already discovered. It is particularly common in fruit or milk allergy.

Food allergy with gastrointestinal manifestations exists frequently with additional complicating organic or functional pathology. Thomas and Wofford[13] found organic gastrointestinal disease associated with 44 per cent of their cases. I formerly believed

that food allergy was rare in peptic ulcer but now, except for the non-cooperative patient, rate it the most important factor responsible for failure of the medical plan of treatment in this disease. Food allergy co-exists with chronic cholecystitis or cholelithiasis, or may produce a syndrome which mimics biliary colic as reported by Alvarez.[2] Recent studies in chronic ulcerative colitis point to the important accessory role allergy may play. Andresen[9] in 33 of 50 cases, or in 66 per cent, demonstrated the presence of food allergy. Mackie[11] found suggestive clinical evidence of allergy in 28 of 36 patients or in 77 per cent. However, excluding cases with flare-ups from excessive doses of vaccine or respiratory infection 11 of the 36 patients were thought to be allergic to foods.

This discussion would be incomplete without mentioning the role of psychoneurosis as related to food allergy. Both conditions are common and often exist by chance in the same patient. When an anxiety syndrome is well developed one usually finds that the patient is inclined to exaggerate food disagreements. Finally, one may become convinced that some are 99 per cent neurotic and one per cent allergic. Other patients are found to be primarily allergic but because of much psychic trauma caused by unsuccessful therapy their latent psychoneurosis become aggravated.

Treatment of the patient with food allergy consists of elimination and avoidance of the foods to which patients are sensitive. The avoidance of foods over a period of time may result in partial or complete desensitization. Every six to 12 months patients should be encouraged to try foods which had previously disagreed. Desensitization by the oral or hypodermic routes has not proved either practical or successful. Food allergy should never be excluded except by food trial. The methods described do no harm and should be used as a diagnostic tool more frequently than is now the custom.

The principles which have been reviewed are illustrated by the following brief case reports:

CASE REPORTS

No. 1. Mrs. M., food allergy, chronic cholecystitis, cholelithiasis, normocytic anemia, malnutrition. The patient was a white female of 46 who complained of dyspeptic symptoms and pain in the right upper quadrant for many years. Fifteen years ago the appendix was removed and the gallbladder pronounced normal. There was bloatedness and much belching about an hour after meals with attacks of pain in the right upper abdomen. She suspected many foods of causing trouble and had limited her diet to such an extent that during a period of a little more than a year the weight had gone down from 145 to 93 pounds. The red blood cells numbered 3,570,000 with 10.6 gm. or 73 per cent hemoglobin. Cholecystogram showed a faintly outlined gallbladder shadow with negative shadows and with poor emptying. Treatment for anemia and vitamin therapy were given. An elimination diet was begun and with relief of symptoms additional foods were added. Lemon, grapefruit, corn, milk, chocolate, and cauliflower have been found to disagree. There has been a weight gain of 32 pounds and the anemia is corrected. The dyspeptic symptoms have been greatly relieved but some pain in the right upper quadrant by observation has been related to the existing cholelithiasis. The future will no doubt make clear the need for cholecystectomy. This patient definitely had cholelithiasis but the poor general condition made it advisable to treat other conditions first. Anti-anemic therapy and a high caloric elimination diet disclosed foods to which the patient was sensitive and corrected most of the digestive difficulty.

No. 2. V. C., food allergy complicating peptic ulcer. A young man of 26 presented himself with a story of trouble dating back 11 years. There was epigastric pain after meals, bloatedness, belching, and the taste of foods after eating them. The longest period of relief had only been one month. Without any study he had submitted to an appendectomy and to a second operation to release adhesions without any benefit. Previous study had shown an ulcer but bed rest for one month and a milk diet brought only partial relief, and when foods were added to the diet the usual symptoms returned. One sister suffered from asthma. A definite hyperacidity was present. X-ray showed a deformed duodenal cap. Careful questioning did not reveal any known food disagreements. Intradermal tests showed a strongly positive reaction to milk, and positive reactions to white potato, orange, oyster, beef, crab, fish, and spinach. The ambulatory treatment for ulcer was modified so that an elimination diet was ordered which excluded milk and other common foods. Banana,

pork, eggs, and Irish potatoes have been found to reproduce the original symptoms. The patient has been entirely relieved except on one occasion when a return to cigarette smoking gave rise to slight pain.

No. 3. Mrs. V. T., food allergy, psychoneurosis. A female of 57 with a psychoneurotic background presented herself with a picture of gastrointestinal symptomatology which had been present for 19 years. She had received much previous treatment without obtaining relief and was considered a neurotic. Epigastric pain which at times extended through to the back was her principal complaint, but nearly all other dyspeptic symptoms occurred frequently. There was a marked anxiety syndrome present with fear of many foods, so the diet was extremely limited. Migraine had been present for years but had subsided.

Complete laboratory and x-ray studies failed to reveal anything of clinical significance except for a moderate hyperacidity. The failure of previous modes of therapy to give relief and the absence of a satisfactory diagnosis necessitated the consideration of food allergy. Treatment was started with an elimination diet selected from hypoallergic foods to which the patient gave no previous history of sensitivity or to which there was no positive skin test. The addition of foods to this basic diet has proved the existence of allergy to milk, corn, rice, all citrous fruits, bananas, pineapple, grapes, pear, beets, and cauliflower. Eighteen months have elapsed since this mode of treatment was started and the results have been excellent. The general attitude and personality of the patient have changed so she now supports a ne'er-do-well husband without complaint.

No. 4. Mr. R. R., food allergy, migraine, irritable colon. A white male of 34 presented himself for treatment following six years of continuous gastrointestinal symptoms and headaches. Constipation was frequent with much bloatedness, expulsion of flatus, and at times diarrhea. There was frequent pain of a burning character referred to the right lower quadrant and upper thigh. An appendectomy followed by an operation to release adhesions had not afforded any relief. Unilateral frontal headaches with nasal obstruction occurred about once a week. Much sinus study and treatment had been unproductive. The patient stated that daily symptoms occurred. He had been labeled a marked psychoneurotic.

His mother and aunt suffered from asthma. There was no helpful history of food disagreement. There were a number of one plus reactions to foods by intradermal tests. Blood eosinophilia was absent. In spite of meager support for an allergic basis for this patient's symptoms a modified elimination diet was tried. The results after a period of eighteen months have been perfect. The addition of milk, chocolate, raw apple, corn, sweet potato, tomato, and wheat have repeatedly reproduced all symptoms complained of by the patient. Food allergy accounted for nearly all of the pathology; a mild degree of psychoneurosis was also present.

No. 5. Mr. R. H., food allergy, chronic amebiasis. A white male of 59 presented many gastrointestinal complaints which had troubled him for more than 30 years. The symptoms were: pyrosis, bloatedness, water brash, joint pain, itching in the heels and palms, pruritis ani, canker sores, and constipation. He listed 21 different foods which he believed disagreed and he had restricted his diet greatly. Examination revealed a poorly nourished man who proctoscopically presented the picture of mucous colitis. The stool was positive for numerous cysts and trophozoites of *Endameba histolytica*. Skin tests showed positive reactions which agreed well with the clinical history. The amebiasis was first treated. Following this he was given an elimination diet based on the history and the positive skin tests. All symptoms have been relieved and there has been a gain in weight of nine pounds. He now takes a well balanced diet including many foods to which he formerly considered himself sensitive.

TABLE 1.

ALVAREZ ELIMINATION DIETS

First Diet	Second Diet	Third Diet	Fourth Diet
Lamb	Lamb	Lamb	Beef or chicken
Rice	Rice	Rice	Corn
Potato			
Butter	Butter	Butter	Butter
Sugar	Sugar	Sugar	Sugar
Lemon	Lemon	Lemon	Lemon
Canned pear	Canned pear		
Jello	Jello	Jello	Jello

TABLE 2.

ROWE ELIMINATION DIETS 1941

Elimination Diet 1.
Elimination Diet 2.
Elimination Diet 3.
Elimination Diet 4. (milk and tapioca)
Cereal Free Elimination Diets 1, 2, and 3.
Fruit Free, Cereal Free Elimination Diets 1, 2, and 3.
Fruit Free Elimination Diets 1 and 2.
Elimination Diets for Infants and Children.
Weight Reduction Elimination Diets.
Diabetic Elimination Diets.

TABLE 3.

HYPO-ALLERGIC FOODS

Cereals	Corn,* rice, tapioca.
Fruits	Apricot, date, grapefruit, lemon, peach, pear, pineapple, prunes, raisin, raspberry.
Vegetables	Artichoke, asparagus, beets, carrot, celery, eggplant, endive, green pepper, lettuce, lima beans, mustard greens, okra, peas, spinach, string beans, tomato,* turnip, white potato.*
Meats	Bacon, beef, chicken, lamb.
Miscellaneous	Cornstarch, gelatin, Karo syrup, lemon extract, mazola, maple syrup, molasses, pecans, Royal baking powder, salt, sugar, vanilla.

*Used with caution.

SUMMARY

1. Food allergy occurs more frequently in gastrointestinal disease than is at present realized.

2. The methods utilized must be individualized for each clinical problem.

3. Practical suggestions for utilizing the elimination diet are presented.

4. Treatment of these cases consists of the recognition and avoidance of the offending foods.

5. Food allergy is frequently associated with other functional or organic gastrointestinal tract pathology.

6. Five illustrative cases have been reported.

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DISCUSSION

Dr. A. A. Herold (Shreveport): Dr. Shushan has covered the subject in his usual masterly way as far as time would allow; furthermore, I would like to commend his conservatism. However, I am reminded of an article I read several years ago entitled "Diet from Infancy to Old Age", in which the author went into detail as to the requirements of infants, growing children and adolescents and then concluded: "And here we stop, for, if a person does not learn, after 20, what is best and agrees with him most, it is no use to tell him as he will not follow the directions given." This is true, to a certain extent, as many people who formerly got "hives" or "nettle rash" from strawberries and certain other foodstuffs now avoid them for another reason; they have learned that it is not idiosyncrasy or intolerance, but that they are allergic to them.

I want to stress one factor, brought out by Dr. Shushan, that is, the possibility and probability of concomitant organic lesions, which should not be overlooked on account of being too allergy conscious.

Then, there are other pitfalls, such as giving anti-allergic therapy credit for cure in those who are just beginning to show manifestations, whereas the symptoms may have been fleeting ones, relieved by the therapy, but precursors of something more serious.

Let me repeat that I am glad to note Dr. Shushan's conservatism and his more or less strict adherence to principles as laid down by Vaughan and Rowe, both of whom I have heard in discussions, and who are probably the leaders in thought in this field today. They place more reliance on test diets than in test proteins for their diagnoses of gastrointestinal allergy.

The first principle of treatment, in this as in other conditions, is, of course, to remove the cause and in order to do so we should follow such rules as laid down by the essayist; just like you remove a car from the body of one who gets crushed under it, but, then we must be ever on the alert to avoid the removed cause.

CLINICO-PATHOLOGIC CONFERENCES IN NON-TEACHING PRIVATE HOSPITALS*

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Surely an explanation, if indeed not an apology, is needed before so unorthodox a communication as this one is presented here. It should be stated at once that no results of laboratory research or clinical investigation are herein reported; but simply the development of a hospital staff activity, from one that was most vexing in its presentation, to one that can be said to be, while far from perfect, at least satisfactory. Since a monthly clinico-pathologic conference is required in all class A hos-

*Read before the sixty-third annual meeting of the Louisiana State Medical Society, New Orleans, April 29, 1942.

†From the Department of Pathology, Hotel Dieu, New Orleans.

pitals, and since the difficulties which formerly surrounded the presentation of this feature at Hotel Dieu may be at present disturbing those responsible for this activity in other non-teaching hospitals, it was thought that a report of our experience might be of interest.

The ideal clinico-pathologic conference is most nearly approached in large teaching or public hospitals, where refrigeration facilities and other opportunities for keeping the bodies of cases selected, permit the performance of the actual autopsy at the time of the conference. Under these conditions, the conferences are held at scheduled times, the clinical history and laboratory findings are reviewed, analyzed and discussed in detail, a complete differential diagnosis is made; and then, with the clinical aspect of the case fresh in mind, the pathology is exposed. But it is this presentation of the pathologic material in a simple and interesting manner which has caused the greatest difficulty in holding conferences in non-teaching private hospitals of relatively small size, and it is with this which we are primarily concerned at present.

When clinico-pathologic conferences were first inaugurated at Hotel Dieu about 10 years ago, the ideal procedure outlined above could not be attempted because: first, there was a lack of sufficient autopsy material; second, refusal by the family to allow a body to be kept for even the short time during which a group might be gotten together to hold a conference; and third, the lack of refrigeration facilities, in which bodies might be kept until the scheduled conference time. In short, our difficulties concerned the proper presentation of the pathologic material, and were those which are encountered in any private non-teaching hospital under the same circumstances. So, at that time, the use of Kaiserling-fixed material was employed. The clinical aspect of the case was presented by the physician in charge, and the Kaiserling-fixed tissue, placed in pans, was passed about the audience during the pathologic part of the discussion. Important specimens were then mounted permanently in glass jars and became part of the hospital's museum. The distortion and loss of color, so frequently characteristic of even the best Kaiserling specimens, and the general inconvenience of handling this material, made us look about for some other procedure.

Next an opaque and a microscopic slide projector were obtained. Fresh organs, frozen in the freezing compartment in an electric refrigerator keep indefinitely, and when thawed, lose very little of their original appearance. At the conference, therefore, the clinical aspects were presented as before and the thawed gross specimens projected on the screen with the opaque projector. Microscopic slides of the lesions were then presented with the microscopic projector. This was an obvious improvement, but was far from perfect. The moist gross specimens were awkward to handle and often unpleasantly odoriferous. The slide projector, using carbon-arc illumination, was usually temperamental.

In the fall of 1937, having seen some Kodachrome transparencies of gross and microscopic pathologic material, it was realized that this was probably the answer to our difficulties in presenting the pathologic aspects of our conferences. Since then, any case that presents interesting features from the standpoint of a conference, is photographed as completely as possible in all of its pertinent phases. Color transparencies, on 2 x 2 inch lantern slides, might be made of the patient's appearance, temperature charts, electrocardiograms, and x-rays, as well as of gross and microscopic pathologic specimens, obtained either from the operating or autopsy room, or both. (All of these slides are not made on every case — only those which are pertinent).

The clinical and laboratory findings are abstracted in some detail and mimeographed copies of this data are made and distributed among those present at the meeting. A member of the staff, who has no previous knowledge of the case is asked to lead the discussion, and, some days before the conference, is given a copy of these

clinical findings. He is, therefore, prepared to analyze the clinical side of the case in detail and make a complete differential diagnosis. Any lantern slides that may pertain to the clinical or roentgenologic aspects are exhibited at this time. The case is then thrown open to general discussion, during which the attending physician may, if he can, elucidate the subject further. After the diagnostic possibilities have been exhausted, and a probable conclusion reached, the pathologic transparencies, gross and microscopic, either from the operating or autopsy room, are shown. The pathologic findings are then described and discussed in detail, always attempting to correlate the pathologic with the clinical phenomena. With all of these facts before it, the conference then closes with a general discussion of the entire case, including the therapy. Attention is called to the fact that the flexibility of photographic methods allows for the presentation of slides of clinical material at these conferences as well as the slides of the pathologic material.

LANTERN SLIDES

The preparation of these lantern slides is the responsibility of the pathologic department. While it is not necessary that this department take over this work, it is absolutely necessary that some one individual control it alone. Otherwise many different cases will be proposed by various interested persons, numerous exposures of unrelated and unimportant material will be made, much film will be wasted, and great confusion will result. At Hotel Dieu, the photographic equipment is the property of the hospital, but is under absolute control of the Department of Pathology, who, although attempting to cooperate to the fullest with the members of the staff, finally selects the cases to be photographed and presented.

The outlay for the photographic equipment represents an investment of less than $300. It consists of a Leica camera, model E, No. 50055 with a f 3.5 lens, that takes a 35 mm. picture. Used with this camera is a ground glass focusing attachment, various extension tubes for close-up work and a photomicrographic attachment. These accessories are made by Leica for use with this particular camera. Various other apparatus, such as a copying stand, photoflood lamps, a camera tripod, a Weston photometer, and a microscopic lamp with a water-flask condenser and 3200 Kelvin bulb have also been found quite necessary. Kodachrome type "A" film has been found most satisfactory for this work, and is even used, with a Kodachrome type "A" filter, for taking x-ray plates, for it has been found to bring out more detail than ordinary "black-and-white" film. The slides are presented with an Eastman Kodaslide projector having a 28 foot focal length for a 6 foot screen.

While this seems to be an elaborate and expensive outlay, it should be remembered that the initial investment, with ordinary care, is practically the last. The actual transparencies themselves, mounted and ready for use, cost less than 20 cents, and for each case we rarely use more than 10 slides and usually four to six. Remembering that these slides become part of the hospital's pathologic museum and comparing their cost with that of mounting and preserving Kaiserling specimens, the economy of this method is at once realized, to say nothing of its other advantages.

However, the most necessary part of the set-up is a member of the hospital staff interested enough in photography to be able to turn out creditable work. At Hotel Dieu, we have been fortunate in having one of our laboratory technicians with this qualification, and no doubt such a person can be found in some one department of every hospital. The technic is not too difficult and can be perfected by almost any one who is interested enough in photography.

Besides the use of these transparencies in the clinico-pathologic conferences as previously outlined, other uses have suggested themselves as time passed. As indicated before, when properly filed and cataloged, they have filled the role of a hospital museum very much more cheaply than the usual fixed gross specimens, and in many ways better. They take up less room, they

keep better, they are more easily transported and the microscopic sections can be projected along with the gross. From this store of readily available material, illustrations from cases of a similar or contrasting type may be used along with those of the case under discussion at a conference. Or a member of the staff may use these slides to help illustrate a lecture or essay of his own. Recently, slides of interesting specimens have been shown at each staff meeting along with a thumbnail clinical history, and have been well received. Finally, they have been valuable as teaching material in the nursing school's pathology course.

DISCUSSION

Dr. Edwin H. Lawson (New Orleans): Dr. Couret has most ably presented some of the difficulties attending the presentation of clinico-pathologic conferences in one class of hospital, that is, the non-teaching, private hospital. He has also presented the solution to some of these difficulties. However, there still remain a few other conflicting factors to such conferences.

Possibly the most difficult factor to overcome is the selection of a time for the conference suitable to the attending staff of the hospital and to the pathologist. It is indeed very discouraging to prepare the material for a conference and have only two or three members of the staff in attendance.

Another factor causing the pathologist's concern is the lack of cooperation of the attending staff in securing material for the conferences. There still remain several physicians who not only decline to assist in obtaining an autopsy on their patients, but even go so far as to discourage the relatives of the deceased from giving permission. As this source is one of the largest for material, such practice certainly places the pathologist in an embarrassing position.

A third factor involved is the obtaining of sufficient and qualified personnel to assist in preparing the material for a conference. To overcome this hazard the laboratory must have the full cooperation of the administration of the hospital.

Dr. Couret has illustrated his presentation with some excellent slides. In fact I have seen none better on exhibit in any meeting. To prepare such slides requires a large amount of time and efficient technic. In fact, it requires the full time of some person who is accomplished in photography and who will devote sufficient time to the project.

I would like to ask Dr. Couret what he has used in his pictures as a background for the gross specimens, and how the specimens were prepared so that no leakage occurred while they were being photographed.

Dr. William H. Harris (New Orleans): I merely want to state that the difficulties of such conferences are nothing unusual. I think all we have to do is go out to Charity Hospital, where they have a tremendous staff, surgical and medical, and we can appreciate the small percentage of attendance. On the other hand nothing deserves more complete cooperation than clinico-pathologic conferences, and I am sure it is regrettable that we cannot obtain better cooperation. I doubt that there is any solution to the problem except perhaps where staff appointments make certain percentage of attendance obligatory—even this would not be exacted.

Take the detail and effort that Dr. Couret has gone to here. It is a treat to anyone, I am sure. It is amazing to be able to view the pathology under such desirable conditions. I am just back from the meeting of one of our leading national societies of pathology, at which many of our leaders gave papers, and there were no presentations of lantern slides in color that excelled and most were not as good as those which Dr. Couret has presented here today.

Dr. John H. Connell (New Orleans): I would like to add my expression of appreciation and I am sorry that some of you were so late and could not see the photographs as they were run in this section. They were a beautiful bit of photography.

In line with Dr. Couret's paper, I might add that one way we have found to make members attend the clinico-pathologic conference is to have as many of the staff as possible participate.

Dr. John S. Couret (in closing): As regards the attendance, that is something which is in the hands of the gods. At Hotel Dieu, the intern staff, for which these conferences are primarily gotten up, attend pretty well. There are also a few members of the visiting staff who attend regularly. Attendance, of course, depends a great deal upon the type of presentation and the interest which it stimulates, and the amount of time that the staff has to give to it. I do not know that we can improve the latter; but I will say it is my impression that there has been more interest in a conference given in this present form than previously. Of course, there will never be the interest in any presentation as that in which the actual autopsy is performed.

As regards the personnel and the preparation of these slides: You have to have somebody who

is interested enough to study the photographic problems out, and Mr. Carlson, I think has done very creditably. Personally, I am not interested in photography at all, and if left to me there would not have been any of this work done.

In regard to the background, Mr. Carlson has hit on the idea of using the discarded black paper in which x-ray films come. We get everything ready and put the specimen down on the black paper and take the picture right away. It has worked out nicely. We are planning to get a board and paint it with black or dark brown flat paint and use that. I think that is going to be the best answer for a background. Dark green or dark brown will not clash with any of your specimens, but will furnish a good contrasting background.

NEW ORLEANS
Medical and Surgical Journal

Established 1844

Published by the Louisiana State Medical Society under the jurisdiction of the following named Journal Committee:

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SUBSCRIPTION TERMS: $3.00 per year in advance, postage paid, for the United States; $3.50 per year for all foreign countries belonging to the Postal Union.

News material for publication should be received not later than the eighteenth of the month preceding publication. Orders for reprints must be sent in duplicate when returning galley proof.

Manuscripts should be addressed to the Editor, 1430 Tulane Avenue, New Orleans, La.

THE JOURNAL *does not hold itself responsible for statements made by any contributor.*

SOUTHERN MEDICAL ASSOCIATION

The annual meeting of the Southern Medical Association was held a few weeks ago in Richmond and was unusually successful. In spite of the difficulties of travel, over two thousand physicians and their wives registered to hear one of the most instructive and interesting programs that this society peculiar to the South has ever given. The scientific papers were on a high plane and their discussion was very general. It will please the members of the Louisiana profession to learn that Dr. Lucien LeDoux was honored by being made Chairman of the Council and Executive Committee. This, in the organization, is the body that makes possible the smooth running of the Southern Medical and which is the functioning governing body. Those who know Dr. LeDoux can well appreciate why he was selected for this signal honor. A charming gentleman socially, always a man of force, initiative and imagination in his professional activities, he will make an excellent man for the position which his colleagues honored him and themselves by his selection.

While this information is not definite, rumor has it that the Southern Medical Association will not have its annual big meeting next year and will cease to hold these meetings until after the present emergency is over. The thought occurs that a scientific body such as this organization should continue to function despite the difficulties in travel and the pressing need of doctors in their various localities. Science must not be allowed to come to a dead stop in spite of war. The problems arising as result of war should have a free and frank discussion and researches, investigations and studies that are a by-product of war activities should be made known to all the medical profession by meetings such as those held by the Southern Medical Association.

MENTAL DISORDERS IN THE ARMY

The figures that are put out by the Surgeon General's office relative to the soldiers who are discharged for disability arising as result of mental disorders, are most distressing. Mental diseases seem to be the biggest problem at the present time that the physicians in the Service of Supply have to contend with. There are a large number of these patients with psychiatric disturbances. As evidencing this statement is the fact that there were 8,145 such discharges for mental disease for the year 1942 up until September 1. The next most frequent cause for discharge was tuberculosis with only 1,281 men discharged with this diagnosis. Mental patients in the Army are not only causing trouble in the local commands but when they arrive at the station and

general hospitals it is extremely difficult to get rid of them. They bulk large in the hospital census and in some of the hospitals these patients represent from one-sixth to one-eighth of the total number of patients.

The difficulties in getting rid of the mental cases lies in the fact that provision has to be made for their care after they leave the hospital. They cannot be returned to civil life as the ordinary individual discharged for some one or another cause. If families are unwilling to accept these patients then they must go to state institutions and many of the state institutions are now filled to the brim, in fact some states are refusing to take their citizens who have been inducted into the Army and then have broken down mentally.

The eliminating of a potential mental case by the induction board would be very much facilitated if information of the past history of a man was sent to the induction station. It is obvious a man who has a history of epilepsy, who has been a problem child, who has been up before minor courts, is just the type of person the psychiatrist at the induction station would eliminate did he know about such a man's history. In some states it has been possible to get this information but these are few and far between. It would be a tremendous saving to the Government if the doctors who know these people could give what they know about the past history to the draft boards to be sent with other papers to the induction station.

In the meantime the psychiatric examination at the induction station is working passably well. Unfortunately there is no exact, brief and scientific way of determining a man's mental capacity. The psychiatrist might well follow the leadership of the psychologist in standardizing some form or series of tests which at least would be elucidating, although not as conclusive, for example, as the x-ray examination of a man's chest.

One wonders if these embryo soldiers break down in such numbers before they have even smelled battle smoke, what is going to happen in the armies that are in actual combat. Will there be a large number of mental breakdowns under combat conditions or will most of these soldiers be eliminated before that time?

—o—

LOCAL SULFONAMIDE THERAPY

The brilliant results that were achieved at Pearl Harbor, where, for the first time, the sulfonamides were used locally in a large series of traumatic cases, has stimulated the profession to such an extent that it is now a common practice to apply one or another of the sulfonamide preparations to wounds and injuries. To study the various preparations in order to find the one which was least irritating and most efficacious, Osgood* performed a series of experiments and investigations by the marrow culture technic. In this study he found that sulfanilamide is the least effective of any of the sulfa group and that sulfathiazole more nearly fulfills the indications for local antisepsis. The author points out that none of the drugs is capable of destroying a large number of organisms when they are present in any local area of infection and that this consideration must be borne in mind in preparing the field for the application of sulfathiazole. He points out further that for prophylaxis injection the drug should be applied as soon as possible after injury in order that the full effect may be obtained before a large number of organisms have grown in and around the necrotic and dead tissue.

In the treatment of local collections of pus it is advisable to obtain by oral or intravenous use of the drug a high blood level. Osgood points out also that sulfathiazole by mouth wipes out the former contraindication to early operation on infected cases because the circulating drug will take care of the organisms that may be disseminated by the blood stream in an operation. The powdered drug may be applied locally after the removal of necrotic tissue and the cleansing of the wound well with saline solution saturated with sulfathiazole. It is quite pos-

*Osgood, E. E.: Principles which should govern the local use of the sulfonamide drugs, Surg., Gynec., & Obstet., 75:21, 1942.

sible to close infected wounds without drainage, as a matter of fact, according to Osgood this is the method of choice. The sulfathiazole powder should be sprinkled or blown on to the wounded surface immediately before coaptation. If a wound is treated in less than an hour the sulfa drug by mouth should not be necessary.

Other local uses of the sulfa drugs include sulfathiazole powder as a dusting powder in epidermophytosis. In impetigo it may be used orally and by local applications. As a matter of fact, any ulcerative lesions, not tuberculous or syphilitic in nature, may be helped by the local application in a dry form or in a suitable jelly medium. Sulfathiazole is being used with most beneficent effects in gonorrheal ophthalmia. It has been used in the treatment of corneal ulcers and other bacterial infections of the eye.

In ear, nose and throat lesions sulfathiazole powder is advocated locally, being blown from a powder blower on the site of operation immediately after the operation is finished. Sulfathiazole may be used locally in acute maxillary sinusitis, in conjunction with oral administration of the drug. It may be used in otitis media, and as a prophylactic after mastoid operation it is recommended that sulfathiazole be given by mouth and that the local wound be irrigated with saline solution saturated with sulfathiazole.

After a tooth is extracted, the resulting cavity should be filled with powder and the gums sewed over it.

The use of sulfaguanidine by mouth in abdominal surgery is well known. Powdered sulfathiazole should be used locally on the operative site during and after the operation. If there is general peritonitis it is suggested that the abdominal cavity be rinsed out with the saline saturated sulfathiazole solution and then 10 to 30 grams of the powder should be sprinkled into the abdominal cavity.

In gynecologic and obstetric conditions sulfathiazole is used locally, as between the cut surfaces in perineorrhaphy and episiotomy wounds. The uterus is irrigated with the solution until the return fluid is clear in the instance of postabortal infections. The powder is then placed in the uterine cavity.

In orthopedic surgery, when there are operations on infected bones, again the involved areas should be filled with powdered sulfathiazole, but the drug of course should be given likewise by mouth.

In view of the new developments in the local application of the sulfa drugs it would seem that in practically every type of operation in which infection exists or which may be potentially present, sulfonamides should be used locally. Local application may be made in powder form, in a lubricating jelly, or by saline infusions for washing out infected areas.

HOSPITAL STAFF TRANSACTIONS AND CLINICAL MEETINGS

SOUTHERN BAPTIST HOSPITAL

The regular monthly meeting of the clinical staff of the Baptist Hospital was held in the staff room at 8 o'clock on the evening of November 24. Dr. H. W. E. Walther presented a paper on castration plus stilbestrol in carcinoma of the prostate. The next presentation was the report of an interesting case by Drs. W. H. Gillentine and Gilbert Anderson. Another instructive case was also presented and reported to the staff by Drs. Hilaire Ogden and E. Z. Browne.

CHARITY HOSPITAL

The regular monthly meeting of the Medical Section of Charity Hospital was held on Tuesday, November 17 at 8 p. m. The program consisted of a report by Dr. B. Pearson on multiple myeloma, and the analysis of an interesting neurologic case by Dr. P. H. Jones.

TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

During the month of November the Society held one regular scientific meeting. The program was as follows:

1. Rubber Goes Synthetic. Motion Picture and Illustrated Lecture. By Mr. V. W. Nunez, Standard Oil Company of Louisiana.

At a general meeting of the Society held Monday, November 9, 1942, the following nominations for Officers of the Orleans Parish Medical Society and Delegates to the Louisiana State Medical Society, 1943, were handed to the Secretary in accordance with the By-Laws:

President-Elect—Dr. Edwin L. Zander
First Vice-President—Dr. George H. Hauser
Second Vice-President—Dr. Philip H. Jones
Third Vice-President—Dr. Walter Levy
Secretary—Dr. Daniel J. Murphy
Treasurer—Dr. A. V. Friedrichs
Librarian—Dr. Max M. Green

Additional members to the Board of Directors: Dr. Paul G. Lacroix, Dr. E. L. Leckert, and Dr. E. J. Richard.

Delegates to the Louisiana State Medical Society: Dr. Gilbert C. Anderson, Dr. Edgar Burns, Dr. Edmund Connely, Dr. A. V. Friedrichs, Dr. Max M. Green, Dr. George Hauser, Dr. Paul G. Lacroix, *Dr. Spencer B. McNair, Dr. Waldemar R. Metz, Dr. Robert Sharp, Dr. H. Ashton Thomas and Dr. Edwin L. Zander.

*Declined.

NEWS ITEMS

Drs. Val H. Fuchs, Monte Meyer and George Taquino attended the annual meeting of the American Academy of Ophthalmology and Otorhinolaryngology at Chicago, October 11-14.

Major Chester S. Fresh has been made Commanding Officer of the Station Hospital at Grenier Field, Manchester. Major Fresh, who is an Army Air Corps Surgeon, has been on active duty since 1940.

Dr. George McCoy attended the meeting of the District of Columbia Basic Science Board in Washington, October 22.

Dr. Gilbert C. Anderson read a paper on Neurology at a meeting of the Theta Beta, national honorary biology society; Agramonte, premedical society, and Beta Epsilon Upsilon, national honorary technology group, at Loyola University, October 22.

Drs. E. Carroll Faust and Joseph D'Antoni recently lectured on tropical medicine in schools of the East and North under the auspices of the National Research Council.

Dr. E. A. Bertucci recently attended the meeting of the Southern Tuberculosis Conference at Memphis.

Dr. Gilbert C. Anderson was elected president of the medical staff of Charity Hospital at a recent meeting of the staff. Other officers elected were: Dr. Edgar Hull, vice-president; Dr. W. T. Beacham, secretary; and Dr. Gordon Johnson and Adolph Jacobs, members of the Board of Directors.

CALENDAR OF MEETINGS

Tuesday, Dec. 1—Eye, Ear, Nose and Throat Staff, 8 p. m.

Wednesday, Dec. 2—Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m. Clinico-pathological Conference, Marine Hospital, 7:30 p. m. Hutchinson Memorial Clinic Staff, 8 p. m. Mercy Hospital Staff, 8 p. m.

Thursday, Dec. 3—Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m. Baptist Hospital, Executive Meeting, 8 p. m.

Monday, Dec. 7—Orleans Parish Medical Society Board of Directors, 8 p. m.

Wednesday, Dec. 9—Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m. Touro Infirmary Staff, 8 p. m. Women's Auxiliary, Orleans Parish Medical Society, Orleans Club, 3 p. m.

Monday, Dec. 14—Scientific Meeting Orleans Parish Medical Society, 8 p. m.

Tuesday, Dec. 15—Charity Hospital Medical Staff, 8 p. m.

Wednesday, Dec. 16—Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m. Clinico-pathological Conference, Marine Hospital, 7:30 p. m. Charity Hospital Surgical Staff, 8 p. m. Clinico-pathologic Conference, Hotel Dieu, 8:15 p. m.

Thursday, Dec. 17 — Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

Friday, Dec. 18—I. C. R. R. Hospital Staff, 12:30 p. m.

Monday, Dec. 21—Hotel Dieu Staff, 8 p. m. Clinico-pathologic Conference, Baptist Hospital, 8 p. m.

Tuesday, Dec. 22—Baptist Hospital Staff, 8 p. m.

Wednesday, Dec. 23—Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m. French Hospital Staff, 8 p. m. New Orleans Hospital Dispensary for Women and Children Staff, 8 p. m.

Thursday, Dec. 24—Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

Wednesday, Dec. 30—Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.

Thursday, Dec. 31—Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Wednesday of every month	Baton Rouge
Morehouse	Second Tuesday of every month	Bastrop
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of every month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	

OFFICE OF WAR INFORMATION, WAR MANPOWER COMMISSION

"The Directing Board of the Procurement and Assignment Service is pleased to announce that 95 per cent of the 1942 procurement objective of medical officers for the armed forces has already been met. Toward this total a number of States have supplied more than their share of physicians and only a few States are lagging behind in their quotas. It is from these States that the additional physicians needed during the current year should come.

"The recruitment of such a large number of physicians in a few months is a remarkable achievement and another demonstration of the traditional patriotism and unselfishness of the medical profession. In this achievement, and particularly in those of its members who are 'in service,' the profession can justifiably take pride.

"The end, of course, is not yet. Increases in the armed forces will necessitate more medical officers and additional demands will be made upon the profession for medical services in critical war production areas. The Directing Board is convinced, however, that the physicians of this country will respond to future calls for service, whatever they may be, in the same splendid manner with which they have already volunteered for service with the armed forces."

(s) Frank H. Lahey, M. D.,
Harold S. Diehl, M. D.,
Harvey B. Stone, M. D.,
James E. Paullin, M. D.,
C. Willard Camalier, D. D. S.
of the Directing Board.

STATEMENT FROM WAR MANPOWER COMMISSION

Subject: Alien Physicians

The Army and the Navy are not in a position to accept enemy alien physicians as commissioned officers because of the citizenship law. Also many of these physicians do not meet other requirements such as license to practice, internship, or other professional qualifications.

It, therefore, seems inadvisable to recommend that these aliens go into the Army as privates with the expectation of receiving citizenship at the end of three months, for many may not receive it for some reason, and they may not be acceptable to the Medical Corps even though they are given citizenship.

Since there are many places in which these men can be of service in civilian life, it is recommended that efforts be made to place those who are not acceptable for service with the Army or the Navy as temporary employees in hospital positions, in critical areas where more physicians are needed, in special positions in medical schools, and in public health agencies. In such positions they may be rated as essential and may thus be used in their professional capacity.

Until definite rulings are made concerning the admission of this group into the military services, these general policies should be followed.

AN OPEN LETTER

"So much has been said and so much implied about the desirability of drafting 18 and 19 year old men for military service from the viewpoint of emotional stability that it seems that in the public interests that a simple, direct statement should be made on this question.

"Speaking as individuals we wish to assure the public and parents of this age group that there are no grounds for apprehension as to the effect of military service on these younger men as distinguished from the older men. Such statistics as are available indicate that the incidence of mental breakdowns is no greater in the 18 and 19 year age group than in the older group. If anything it is somewhat less. It would seem to us that the proposal now before the American Congress does not unduly compromise the future mental integrity of this particular age group or of the nation. With the government realizing and properly assuming this increased responsibility, we endorse favorable action upon the proposal to include men of 18 and 19 years under the Selective Service Act."

Signed: Adolf Meyer, M. D.,
C. Macfie Campbell, M. D.,
Foster Kennedy, M. D.,
C. Charles Burlingame, M. D.,
Edwin G. Zabriskie, M. D.,
Winfred Overholser, M. D.,
S. Bernard Wortis, M. D.,
Tracy Putnam, M. D.,
Oscar Diethelm, M. D.

CIVILIAN DEFENSE—EMERGENCY BASE HOSPITALS

The Medical Division of the U. S. Office of Civilian Defense, through its Regional Medical Officers and State Chiefs of Emergency Medical Service, has now made emergency provision for the establishment of a chain of Emergency Base Hospitals in the interior of all the coastal states. They will be activated only in the event of an enemy attack upon our coast which necessitates the evacuation of coastal hospitals. Each base hospital will be related to the casualty receiving hospital which has been evacuated and it is expected that the staff will be recruited largely from the parent institution.

In order to meet a sudden and unexpected crisis without delay, arrangements have been completed with state authorities for the prompt taking over of appropriate institutions in the interior of the state for this purpose and with local military establishments for the transportation of casualties and other hospitalized persons along appropriate lines of evacuation.

More than 150 hospitals in the coastal cities are in the process of organizing small affiliated units of physicians and surgeons, which will be prepared to staff the Emergency Base Hospitals if they should be needed. These units are composed of the older members of the staff and those with physical disabilities which render them ineligible for military service, and of women physicians. In order that a balanced professional team may be immediately available the doctors comprising units are being commissioned in the inactive Reserve of the U. S. Public Health Service so that, if called to duty, they may receive the rank, pay and allowances equivalent to that of an officer in the armed forces.

Dr. George Baehr, Chief Medical Officer of the U. S. Office of Civilian Defense, states that the members of these affiliated hospital units will continue to remain on an inactive status for the duration of the war, unless a serious enemy attack occurs in their region which necessitates the transfer of casualties to protected sites in the interior. Their commissions may be terminated upon their request six months after the end of the war, or sooner if approved by the Surgeon General. Such approval will be given in the event such officer desires active duty in the Army or Navy.

WAR PRODUCTION BOARD

No person shall sell, transfer or deliver, or purchase or accept any transfer or delivery of, or process or combined with other materials: (1) quinine, except for use as an anti-malarial agent; (2) as an ingredient of quinine and urea hydrochloride for hypodermic use, or (3) an ingredient of quinine hydrochloride and urethane. Totaquine may be used only as an anti-malarial agent. Cinchona bark may be used only for the extraction of quinine or totaquine.

Similar restrictions apply to the purchase, sale and use of cinchonine, cinchonidine and quinidine, the first two except as anti-malarial agents, the last salt only as anti-malarial agent or in the treatment of cardiac disorders.

Totaquine is a new term probably unknown to the majority of United States doctors. It is, however, familiar to those who have lived in the Philippines, India and the Malay States. It is derived from the bark of numerous species of cinchona trees which heretofore have not been used for the production of quinine. It will probably be marketed with a notation as to its quinine content.

SOCIAL SECURITY AMENDMENTS REJECTED

Legislation of vital interest to Radiology was introduced in the U. S. Congress on September 9, by Representative Eliot of Massachusetts, in the form of a proposed amendment to the Social Security Act. Now before the House Ways and Means Committee, the bill proposes that state social security programs be federalized; it provides for increased taxation to give cash benefits to workers who are temporarily unemployed on account of sickness; and it provides for payments ranging between $3 and $6 per day to hospitals for hospital care. Radiology is expressly included as a part of the care to be provided by approved institutions, which are defined as "an institution providing at least, bed and board, general nursing care, the use of an operating or of a delivery room, ordinary medications and dressings, laboratory and *x-ray services, and other customary hospital care and services, etc.*"

Immediately the implications of the bill became apparent, Dr. V. W. Archer, Chairman of the Board of Chancellors, conferred with political leaders in Washington, and was assured by ranking members of the House Ways and Means Committee that the proposed amendment would not be considered by Congress during the present session. This advice is substantiated by recent developments on the political front, which indicate that social experiments are out for the duration. As one Washington reporter puts it, "Senator Vandenberg and a majority of Congressmen take the view that the Social Security system now is adequate; that other taxes are stiff enough, without adding to payroll levies. Furthermore, a system of forced savings is being studied, based on the theory that the individual who saves should receive the benefit of the savings." In accordance with this view, Congress froze payroll taxes for old-age insurance at 1% last month.

Organized medicine, and particularly, organized radiology, would be inviting disastrous consequences, however, if it relaxed its vigilance under the assurance that the proposals of social theorists were temporarily blocked. One prominent Washington interpreter warned last week that "Social Security broadening will be pushed next year."

SOUTHERN MEDICAL ASSOCIATION MEETING

At the recent successful meeting of the Southern Medical Association, which was held in Richmond, Virginia, November 10-12, there appeared on the program the following doctors from Louisiana, together with the title of their subjects: M. T. Van Studdiford, New Orleans, who spoke on "Intestinal Parasites and Skin Diseases;" Nathan H. Polmer, New Orleans, whose subject was "Electrodiagnosis in Industrial Practice;" Frank L. Loria, New Orleans, who discussed "Penetrating Gunshot Wounds of the Abdomen;" Lucien A. LeDoux, New Orleans, "Premenstrual Cystitis;" Robert F. Sharp, New Orleans, "Evaluating the Ureteral Splint;" Joseph S. D'Antoni, New Orleans, "Further Observations on Amebic Colitis in the New Orleans Area;" Ernest Carroll Faust, New Orleans, who gave an address entitled "Horizons of American Tropical Medicine;" Chester A. Stewart, New Orleans, "The Use of Cereal Thickened Formulas Instead of Liquid Milk Formulas to Preserve Maternal Nursing;" John S. LaDue, New Orleans, "The Intravenous Use of Cardiac Glucosides;" Grace A. Goldsmith, New Orleans, "The Incidence and Recognition of Riboflavin and Niacin Deficiency in Medical Diseases;" Donovan C. Browne, New Orleans, Chairman's address before the Section on Gastroenterology, entitled "The Patient Following Gastric Surgery;" W. R. Mathews, Shreveport, Chairman's address before the Section on Pathology, entitled "Acute Hematogenous Interstitial Nephritis;" A. Scott Hamilton, Camp Claiborne, "Anatomical and Mechanical Features of Treatment of Fractures of the Humerus;" Maxwell E. Lapham, Washington, D. C., Dean-on-leave, Tulane University School of Medicine, who spoke on "The Civilian Need."

The scientific exhibit of Dr. Grace A. Goldsmith, Assistant Professor of Medicine of Tulane, was one of five exhibits receiving honorable mention.

ANNUAL CONFERENCE OF SECRETARIES AND EDITORS

The Annual Conference of Secretaries and Editors of Constituent State Medical Associations was held in the offices of the American Medical Association November 20-21. The program for the meeting had to do almost entirely with war efforts. The Surgeon Generals of the Navy, Army and the Public Health Services addressed the meeting. Others included Dr. Walter F. Donaldson, Chairman of the War Participation Committee of the American Medical Association; Dr. Fred W. Rankin, President of the American Medical Association; Dr. James E. Paullin, President-Elect of the Association, and others. The Saturday morning program had to do with medical service plans.

MENVILLE TO HEAD CONVENTION

Dr. Leon J. Menville, as president of the Radiologic Society of North America, presided at the 28th annual meeting which was held from November 30 through December 4 in Chicago. Dr. Menville is the first roentgenologist from the South who has been honored by this Society by selection as president. For ten years before his election, Dr. Menville was the editor of "Radiology," one of the outstanding medical publications in the country.

NEWS ITEMS

Dr. C. A. Stewart, Director of the Department of Pediatrics, Louisiana State University, and Dr. Ralph V. Platou, Acting Head of the Department of Pediatrics, Tulane University, attended the annual meeting of the American Academy of Pediatrics in Chicago, November 4.

Dr. Paul T. Talbot attended the Annual Conference of Secretaries and Editors of Constituent State Medical Associations in Chicago, November 20-21.

Dr. John H. Musser is serving on a small committee appointed by the Secretary of War to study the medical care of American soldiers, and to make recommendations concerning the conduct of the Office of the Surgeon General of the United States Army.

The Fifth Annual Forum on Allergy will be held in the Hotel Statler, Cleveland, Ohio, January 9-10.

The next examination of the American Board of Obstetrics and Gynecology will be held Saturday, February 13. For further information address Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh, Penna.

Dr. Josiah D. Bancroft, a Tulane graduate, class of 1931, died while in active service in the Army, September 1, 1942. Dr. Bancroft was a captain, and assigned to active duty at Camp Rucker.

UNITED STATES PUBLIC HEALTH SERVICE

Assistant Surgeon Charles W. Fluke and Assistant Surgeon Wardell E. Mills have been assigned to the District Coast Guard office in New Orleans.

Surgeon R. T. Westman has been assigned to the local Health Department of New Orleans. Assistant Surgeon Richard K. Parrish has been called to active duty and ordered to report to the New Orleans Coast Guard District Office. Assistant Surgeon Carl C. Kuehn has been sent from New Orleans out to the Calcasieu-Lake Charles Health Unit at Lake Charles. Assistant Surgeon Richard A. Flebbe has been sent to the Parish Health Unit in Baton Rouge. Assistant Surgeon Andrew P. Sackett has been relieved from duty in New Orleans and sent to Columbia, South Carolina. Assistant Surgeon James A. Finger has been sent to the Coast Guard Station at St. Augustine, Florida.

CHANGE IN POTENCY OF DIGITALIS

The new Pharmacopoeia (U. S. P. XII) has materially reduced the potency of powdered digitalis. Physicians should bear this in mind when ordering the drug. The new potency is 83 per cent of the potency of the old U. S. P. XI. In other words, the standard dose of powdered digitalis, namely 0.1 gram (1½ grains) will require the administration of six pills as contrasted with five pills of the old standards.

INFECTIOUS DISEASES IN LOUISIANA

The Section of Epidemiology of the Louisiana State Board of Health shows that for the week ending October 10 only four diseases were listed in the weekly morbidity report in numbers greater than 10. There were 338 cases of syphilis, 82 of gonorrhea, 18 of tuberculosis, and 10 of malaria. A goodly number of gonorrhea cases originated in army camps, but only nine of the many cases of syphilis came from this area. For the following week which came to an end on October 17, there were listed 311 cases of syphilis, 115 of gonorrhea, 38 of pulmonary tuberculosis, and 14 of diphtheria. The diphtheria cases were rather unusual in their number. They were scattered widespread throughout the state. Two cases of poliomyelitis arose this week, one in Franklin and one in Orleans Parish, and there were four cases of typhus fever recorded from four different parishes. For the next week terminating October 24, it was found that syphilis as is customary leads by far all other reportable diseases, 482 cases having been found in the state in this week, followed by 36 of gonorrhea, 19 of diphtheria, and 11 of pulmonary tuberculosis. The three cases of typhus fever reported were two from Orleans Parish and one from East Baton Rouge Parish. The diphtheria cases, 12 in number, came mostly from Calcasieu Parish. For the week ending October 31, there was a considerable drop in the number of cases of syphilis, the figures falling to 226. Other diseases reported in this week in numbers greater than 10 include 80 of gonorrhea, 15 of pulmonary tuberculosis, and 10 of malaria. The one case of poliomyelitis was found in Franklin Parish. Two cases of typhus fever were reported, one from Orleans and one from Pointe Coupee Parish. For the week which closed November 7, there were reported 343 cases of syphilis, 86 of gonorrhea, 21 of pulmonary tuberculosis, 14 of diphtheria, 13 of chancroid. Again this week poliomyelitis appeared with two cases, one arising in Madison and one in East Carroll Parish.

HEALTH OF NEW ORLEANS

The Bureau of the Census, Department of Commerce, reports that for the week which ended October 10 there were 120 deaths reported in New Orleans, as contrasted with the previous week when there were 145 deaths. The deaths were divided 76 white, 44 negro, with 13 of them being in children under one year of age. There were 23 more deaths in the city in the next week which came to an end October 17, 96 of these being in the white and 47 in the negro race, with only six infant deaths. For the week that ended October 24, there was a decline in the number of people who died in the City of New Orleans, 125 demises being reported, 72 of which were white and 53 colored, nine of the total being infants. For the week which ended the month of October, 90 of the 148 deaths in the city were among the white population and 58 in the negro, with a very marked increase in the number of infant deaths, these going up to 24. When the infant deaths are small in number, as in the week which ended November 7 when only nine infants died, the death rate falls considerably. Thus, in this week there were 129 of the citizens of the city succumbing to disease or accident, 82 of them being white people and 47 negroes.

DR. JOHN F. MOUTON

1868-1942

Dr. John Franklin Mouton, Lafayette, was born in Lafayette, Louisiana, on June 11, 1868. His preliminary education was received in private schools of Lafayette, with academic degrees of A. B., A. M., LL.D. received from Jesuits College of Grand Coteau. He graduated in medicine from the College of Physicians and Surgeons, University of Maryland, Baltimore, in 1889. He has been a member of the State Medical Society for a long number of years. He died on September 3, 1942.

DR. JOHN K. GRIFFITH

1882-1942

Dr. John Keller Griffith, Slidell, a native of Port Hudson, was graduated from the Tulane University Medical School in 1908 and two years later went to Slidell to practice medicine. He served with the Medical Corps in the first World War. He was a former representative from the Sixth Congressional District, serving from 1936 to 1940. At the time of his death on September 25, 1942, he was President of the St. Tammany Parish Medical Society, and had long been active in medical affairs in his parish. He is survived by his widow, and two children, John K. Griffith, Jr., a student at Tulane University, and Mrs. Carolyn Groves of San Diego, Calif. The death of Dr. Griffith will mean a real loss to the medical profession of Louisiana, as well as innumerable patients of this much loved doctor.

WOMAN'S AUXILIARY

Attention—All parish Auxiliary presidents and treasurers. The address of the treasurer of the State Auxiliary has been changed, and you are now asked to send any payments going to the State Auxiliary to Mrs. R. C. Gowen at 5900 Line Avenue, Shreveport.

And again, attention. This time, parish presidents and publicity chairmen or secretaries. Please send in to the State Chairman of Press and Publicity, at 470 Audubon Boulevard, New Orleans, news items pertaining to your members, and accounts of the activities of your Auxiliaries. Your reporter cannot report unless you help her by serving as correspondents. What are your pet projects and how are you working them out?

Orleans Parish Auxiliary has issued a standing invitation to the wives of all Army and Navy doctors serving in New Orleans to be their guests at every monthly meeting and reception. The members are glad to know these fine women and perhaps the visitors may be a little lonesome in a strange town, and glad to contact the wives of local doctors.

Orleans Parish Auxiliary has made a Christmas gift of subscriptions to six magazines to the patients at LaGarde General Hospital. This Auxiliary is also participating in the sale of War Bonds and Stamps.

Come on, other parishes. Let's leave Orleans out of the news next month and tell them what you are doing. Send me some items by the fourteenth of December, please.

Mrs. James W. Warren,
Chairman, Press and Publicity.

BOOK REVIEWS

Perineopelvic Anatomy from the Proctologist's Viewpoint: By R. V. Gorsch, A. B., M. D., New York City. The Tilghman Company, 1941. Pp. 298, illus. Price, $8.00.

This is an excellent book. Careful study of its contents will richly reward anyone interested in perineopelvic anatomy. While written from the viewpoint of the proctologist, its value is not so limited.

The text is subdivided into nine chapters, each of which thoroughly covers its subject. Throughout, attention is given to embryologic, surgical, and other aspects as they pertain and relate to the anatomy under consideration.

Illustrations are numerous, clear, and well selected.

MAURICE LESCALE, M. D.

Plastic Surgery of the Breast and Abdominal Wall: By Max Thorex, M. D., LL. D., F. I. C. S., F. I. C. A. Springfield, Charles C. Thomas, 1942. Pp. 446. Price $16.50.

This book deals with reconstruction procedures for congenital and acquired abnormalities of the female breast, particularly hyperplasia, inequalities, and other such lesions for which plastic operations may be indicated.

One of the most interesting features of this book, and one of its most commendable, is the fact that it tells the story very well with illustrations. They are excellent and are so well selected that the book is an outstanding example in medical literature of the adoption of some of the characteristics of illustrated weeklies in portraying information. Another interesting feature is the consideration of folk-lore, racial characteristics, and other curiosities concerning the human breast. The technic of operations is well diagramed and the pre- and postoperative photographs of some of the severer abnormalities illustrate what can be accomplished by the hands of a surgeon about to undertake this type of work. Included is a wise counsel in the form of photographs showing bad results obtained by inexperienced operators. Equally expressive is the slight improvement obtained even by an able surgeon when the abnormalities themselves, as illustrated in the preoperative view, may have been considered relatively minor.

The reconstructive surgery of the abdominal wall consists mainly in diagramatic and clinical photographs with accompanying test, to illustrate the type and value of operative procedures; lipectomies, which sometimes may be indicated in cases of the pendulous abdomens of severe obesity.

This is a very interesting book. It obviously will have its greatest interest to the plastic surgeon.

HOWARD MAHORNER, M. D.

PUBLICATIONS RECEIVED

Lea & Febiger, Philadelphia: Diseases of the Liver, Gallbladder and Bile Ducts, by S. S. Lichtman, M. D., F. A. C. P.

The Williams & Wilkins Company, Baltimore: Nasal Medication, by Noah D. Fabricant, M. D., M. S.

D. Appleton-Century Company, Inc., New York: Osler's Principles and Practice of Medicine, by Henry A. Christian, A. M., M. D., LL.D., Hon. Sc. D., Hon. F. R. C. P. (Can.), F. A. C. P.

Coward-McCann, Inc., New York: When Doctors are Rationed, by Dwight Anderson and Margaret Baylous.

W. B. Saunders Company, Philadelphia: Manual of Dermatology, Military Medical Manuals, National Research Council, by Donald M. Pillsbury, M. D., Marion B. Sulzberger, M. D., Clarence S. Livingood, M. D.

The Manual Arts Press, Peoria, Illinois: Tables of Good Values, by Alice V. Bradley, M. S.

Charlotte Medical Press, Charlotte, N. C.: Bacteriology Laboratory Methods, by E. S. King, M. D.

Welfare Council of New York City, New York: Housekeeping Service for Chronic Patients, by Marta Fraenkel, M. D.